THE IRON TRADE REVIEW

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THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The iron trade is not clear as to the relief to be had from the resumption of anthracite mining or when it will come. It is of no particular moment that the coke supply diverted to the East can now go to its normal fields, for there has been more coke at the ovens for weeks than could be moved. Railroads are not much more than replacing used up engines with the new ones that are constantly being added. The question of betterment in the situation is simply a computation of the net result of the restoration of fuel traffic to normal lines. It does not appear on the face of things that the Central West will get any additional locomotives out of the readjustment, as naturally the movement of anthracite for domestic use to Eastern cities will be very heavy for a time, and the lake trade must be taken care of. In the week Valley furnaces have had their worst visitation of coke scarcity, practically all the independent furnaces being banked for several days. The prospect is that some of them will have to go on to a regular schedule of three idle days a week, in which they will accumulate coke for the remaining four days. The United States Steel Corporation furnaces have also suffered in the past week, five being banked at one time. Valley furnaces are now from one to three months behind on deliveries, and Bessemer steel production is cut down by reason of the insufficient supply of Bessemer iron. For the time being buying of pig iron is restricted, though an occasional round lot is reported, one transaction of the week being a sale of 15,000 tons of Virginia basic for delivery in the Chicago District. Some Southern Ohio Bessemer has also been sold. Large transactions in Bessemer are under negotiation, and it is expected that from 250,000 to 300,000 tons will be bought by the United States Steel Corporation, deliveries extending from April, 1903, to the end of the year. It will be necessary, however, before the independent furnacemen name prices on this iron, that they know what they will pay for coke. It is expected that the leading coke interest will fix $3 at ovens as the basis for furnace coke. Southern furnaces for the most part have refrained from naming prices on pig iron for the second half of 1903, though $20 and higher has been paid for first quarter iron. A meeting in New York Friday will settle the basis for the second half, and conservative interests are already expressing concern lest the situation be hurt by the naming of a high price. There will be a very considerable addition to active furnace capacity by the middle of 1903, and prices fixed now are in danger of being determined by present rather than future conditions. Coke supply is a very important factor in all calculations for next year. Additions to oven capacity now under way are extensive, both on the part of steel and furnace companies and of interests that will make coke for the market. A deal is on foot for the acquisition of two Western Pennsylvania coke companies by a large interest operating foundry iron furnaces. The steel market awaits the decision of the Philadelphia duty case, with indications that the importers must go to a higher court for a favorable decision. If imports are thus cut off, some independent producers of bars, sheets and wire will be driven from the market. The week has added to the tonnage of finished material on the books of the mills. A 20,0000-ton plate contract is reported from Chicago, and the United Realty Company has placed 35,000 tons of structural steel with Pittsburg mills. Railroad contracts for bridges have involved large tonnages. The trade in wrought pipe and tubes looks for an early reduction in prices, which jobbing interests understand will be made applicable to all purchases after Oct. 15. Of special interest in the strengthening of the position of independent steel companies is the announcement that the Jones & Laughlin Steel Co. will build a railroad to Lake Erie and establish docks at Girard, Pa.

PITTSBURG.

OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, Oct 22.

The blast furnaces in the two valleys have at last reached the stage where they will be compelled to bank from two to three days every week. The deliveries of coke during the past week were the poorest known in that district in the year, and with but few exceptions all valley furnaces are banked at this writing. For several days, the latter portion of last week, no coke reached the valleys at all, and the entire amount that reached the furnaces in the past seven days is only 40 percent of the requirements of the furnaces. Shipments from the Connellsville region on Monday were very heavy and as it will require at least three days for the coke to reach the furnaces it is estimated that none can resume in full until Thursday. Some of the furnace operators have already decided to bank on Monday, Tuesday and Wednesday, and to operate the remaining four days in the week at full capacity. They are convinced that operations will be more successful in this way and that the percentage of off iron will be materially reduced. Nor are the independent furnaces in the valleys the only sufferers. Furnaces of the constituent companies of the United States Steel Corporation have been affected this week, no less than five having been banked at one time.

In both the upper and lower Connellsville regions the yards of the coke producers are overflowing with stocks that they cannot move, not on account of the shortage of cars but on account of the shortage of motive power, the railroads not having sufficient locomotives to move the trains after they are made up. There seems to be no possible way of helping the situation and the furnace operators are now convinced that the output of their furnaces the remainder of this year and the first quarter of 1903 will be only half of the rated capacity. Shipments on all contracts are from one to two months behind, and deliveries for the first quarter of next year cannot possibly be completed before the expiration of the second quarter. Much iron that was sold for delivery during the last quarter of this year, and on which a special price was named for such delivery, cannot be delivered before the first quarter of next year and unless concessions are made it has been hinted that considerable litigation will ensue.

Bessemer steel production is being curtailed on account of the scarcity of Bessemer iron, but up to date none of the steel plants in this district have been compelled to shut down, hot metal being used at nearly all of the plants.

In heavy lines the market continues exceedingly strong. The Carnegie Steel Co. has received a contract from the United Realty Co., of New York, for upward of 35,000 tons of structural material for delivery next year, although it is probable that the requirements of this company will somewhat exceed that amount. The McClintic-Marshall Construction Co. has been awarded the contract for the erection of the ore and coke bins for the Union Steel Co., requiring about 6,000 tons of material and it is estimated that with the addition of these large contracts, the structural mills in this district are booked up entirely through the first half of next year.

The special convention of the tin plate workers of the Amalgamated Association went into session here this week and are still in session. The rebate proposition of the American Tin Plate Co. is being discussed and present indications are that the proposition will be accepted. Representatives of the America Tin Plate Co. and the independent manufacturers were heard and the matter is now being discussed by the delegates. A majority of them are said to be in favor of the proposition and the vote, which will be taken some time this week, will no doubt insure the foreign rebate business for the American Tin Plate Co., amounting to 1,500,000 boxes annually.

PIG IRON.—The pig iron market has been somewhat quiet during the week, consumers being concerned in securing material contracted for rather than placing order for additional tonnage. Bessemer iron continues to grow scarcer daily, and for prompt shipment small lots have sold as high as $23.25 at valley furnace. For delivery through the first half of next year, furnaces are holding their product at $21 to $21.50 at the furnace. Foundry iron for prompt shipment continues in demand and extreme prices are paid. Northern furnaces are now holding No. 2 foundry for delivery the first half of next year at $22.50 to $23. Forge and basic irons are dull. We revise quotations as follows:

Bessemer, Valley	$21 25 to 22 50
Bessemer, Pittsburg	22 00 to 23 25
No. 1 Foundry	23 50 to 24 00
No. 2 Foundry	22 75 to 23 25
No. 3 Foundry	22 25 to 22 50
Gray Forge, Pittsburg	21 25 to 21 50
Chilled Basic, Valley	20 75 to 21 00
Chilled Basic, Pittsburg	21 50 to 21 75

STEEL.—We note small sales of open-hearth billets for early shipment at $31 per ton and Bessemer billets are held at $29 to $30 according to delivery. Bessemer rods are held at $35 to $36.

FERRO-MANGANESE.—Only English and German manganese is being offered in this market and it is held at $51 to $51.25, for 80 percent, delivered at buyer's mill.

SPELTER.—The market continues unchanged and we quote prime western grades at 4.35c to 4.37½c, Pittsburg.

MUCK BAR.—The muck iron market continues firm at unchanged prices. Prime neutral muck is held at $35.50 to $36 at mill.

SKELP.—Iron skelp, despite the firmness of muck iron, continues to rule low and both grooved and sheared is held at 2c to 2.05c. Steel skelp is held at 2.10c to 2.15c.

PLATES.—The plate situation continues strong and unchanged. The tonnage for next year is very heavy and local mills are quoting 1.85c on all future business. Nominal quotations under the agreement continue as follows: Tank plates, ¼-inch thick and up to 100 inches in width, 1.60c at mill, Pittsburg; flange and boiler steel, 1.70c; marine, ordinary firebox, A. B. M. A. specifications, 1.80c; still bottom steel, 1.80c; locomotive firebox, not less than 2.10c, and it ranges in price to 3c. Plate more than 100 inches wide, 5c extra 100 pounds. Plate 3-16 of an inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra. These quotations are based on carload lots, with 5 cents extra a hundred pounds for less than carload lots. Terms, net cash, in 30 days.

BARS.—Current business in bars was somewhat better the past week than for some time and the shortage in specifications due to the closing of consuming plants in the East was more than made up in the current business placed. Iron bars continue firm at 1.80c, Pittsburg. We make the following quotations: Bessemer steel bars, 1.60c; open-hearth, 1.70; plow beams and cultivator beams, 1.60c, net; channels, angles, zees and tees, Bessemer under 3 inches, 1.70c; over 3 inches, 1.80c; bar iron, 1.80c, Pittsburg, with full freight added to point of delivery. Hoops and bands are quoted at 1.90c, full extras, in 250-ton lots and over, and 2c in less than 250-ton lots; refined iron bars, 2.25c and upwards.

STRUCTURAL MATERIAL.—The United Realty Co., of New York, this week placed an order with the Carnegie Steel Co. for 35,000 tons of shapes for delivery next year. It is probable that the company's requirements for next year will run over this amount, this additional tonnage being provided for in the contract. The market continues very firm and material for prompt delivery is held at prices ranging from 2c and 2.50c. Agreement quotations are as follows: Beams and channels, 3 to 15 inches, 1.60c; 18 to 24 inches, 1.70c; tees, 1.65c; zees, 1.60c; angles from 3 to 6 inches, 1.60c; universal mill plates, 1.60c.

PIPES AND TUBES.—While no change has yet been announced in discounts by the National Tube Co. jobbers are clearing their floors in anticipation of a reduction in prices. Independent producers have cut prices to the extent of 12 to 15 percent and it is believed that the National Tube Co. will meet these prices when its new list of discounts is announced. Quotations to jobbers in carload lots, with freight added to destination, are as follows:

MERCHANT PIPE.

	Black Percent.	Galv. Percent.
⅛ to ½ and 11 to 12 inches	60	48
¾ to 12 inches	67	55

BOILER TUBES.

Steel

	Percent.
1 to 1½ inches	45
2¼ to 5 inches	62½
1¾ to 2¼ and 6 to 13 inches	52½

Iron.

	Percent.
1 to 1½ inches	42½
2¼ to 5 inches	50
1¾ to 2¼ and 6 to 13 inches	40

CASING.

	S. and S. Percent.
2 to 3 inches	58
3¼ to 4 inches	60
4¼ to 12½ inches	68

SHEETS.—Considerable business continues to be placed in black and galvanized sheets with both the American Sheet Steel Co. and independent producers. The latter, however, realize that present prices are profitless under the existing basis for raw material and some anticipate closing their mills shortly unless sheets either advance or steel declines. We make the following quotations on black sheets, one cold pass, in 500 bundle lots or more: No. 28, 2.75c; No. 27, 2.65c; No. 26, 2.55c; Nos. 22 and 24, 2.45c; Nos. 18 and 20, 2.35c; Nos. 14 and 16, 2.25c; Nos. 10 and 12, 2.10c to 2.15c. The competition on galvanized sheets continues very keen and the new prices of the American Sheet Steel Co. is being met by the independent manufacturers. The new prices on galvanized sheets announced by the American Sheet Steel Co. for 500 bundle lots and over are as follows with their equivalent discounts: No. 16, 2.60c, or 75 and 10 and 3½ off; No. 18, 2.85c, or 75 and 10 and 1 off; No. 20, 2.85c, or 75 and 10 and 2 off; Nos. 22 to 24, 3.10c, or 75 and 10 and 2 off; No. 26, 3.35c, or 75 and 10 and 1 off; No. 27, 3.60c, or 75 and 10 off; No. 28, 3.85c, or 75 and 10 off; No. 29, 4.35c, or 75 and 7½ and 2 off; No. 30, 4.50c, or 75 and 10 and 5 off.

WIRE AND WIRE NAILS.—At a meeting of the cut nail manufacturers held last week the present prices of both iron and steel nails were reaffirmed. Owing to the high price of raw material it was found impossible to make a reduction to meet the recent prices announced by the American Steel & Wire Co. We make the following quotations: Wire nails, carload lots, f. o. b. cars, Pittsburg, $1.85 to $1.90; less than carload lots, $1.95 to $2; plain wire, carload lots, $1.75 to $1.80; less than carload lots, $1.85 to $1.90; barb wire, carload lots, $2.15 to $2.20; less than carload lots, $2.25 to $2.30; staples, carload lots, $2.05, and less than carload lots, $2.15. Galvanizing, 30 cents extra. Cut nails are quoted as follows: Carload lots, $2.05, and less than carload lots $2.10, f. o. b. Pittsburg, plus freight to point of destination; terms 60 days, less 2 percent off in 10 days.

MERCHANT STEEL.—The market continues firm with specifications heavy on all kinds of crucible and high grade steel. We quote: Turned, cold rolled and ground shafting is held at 47 off in carload lots and 42 percent off in less than carload lots; tire steel, 2.15c to 2.25c; spring steel, 2.25c to 2.35c; toe calk, 2.30c to 2.40c. The following differentials maintain: Less than 2,000 pounds of a size and not less than 1,000 pounds, 10 cents advance; less than 1,000 pounds of a size, 30 cents advance. Tool steel is quoted 7 cents and upwards, according to the grade.

OLD MATERIAL.—The market continues quiet, little material being moved on account of the prevailing high prices. Our quotations, gross tons, are as follows: Heavy melting stock, $21 to $21.50; low phosphorus melting stock, $23.50 to $24; steel rails, $21.50 to $22; re-rolling rails, $22.50 to $23; No. 1

cast scrap, $19 to $19.50; borings and turnings, $11 to $11.50; busheling scrap, $17 to 17.50.

COKE.—Despite the fact that some coke contracts have already been closed for delivery the first half of next year at prices ranging from $4 to $4.25 for furnace and $4.50 to $4.75 for foundry, it is probable that producers will be compelled to reduce their prices before very heavy buying sets in. One independent producer has decided to take business for the first half of next year at $3.50 to $3.75 for furnace and $4 to $4.25 for foundry. It is altogether probable that the bulk of the contracts for the first half of next year will be closed on this basis as the extremely high prices asked by some of the coke operators would greatly curtail profits on both furnace and foundry operations. For the week ending Saturday, Oct. 11, the productioo of the upper Connellsville region amounted to 256,216 tons and that of the lower region to 47,924 tons, an increase over the production of the previous week of nearly 2,000 tons.

RAILS AND TRACK MATERIAL.—The Canadian Pacific has placed an additional rail order for 10,000 tons with German mills. We make the following quotations: Standard sections, 50 pounds and over, in lots of 200 tons and over, $28; car lots and less than 200 tons, $30; less than car lots, $32; light rails, 8 pounds, $44; 12 pounds, $43; 16 pounds, $41; 20 pounds, $40; 25 to 40 pounds, $38 to $39. Track materials: Spikes, 2.15c to 2.25c; track bolts, square heads, 2.50c; hexagon heads, 2.65c; fish plates, 1.60c.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, Oct. 21.

Taking the market as a whole, it has a quiet aspect. Aside from plates, of which 20,000 tons have been sold during the past week, there has been no heavy buying of any material. This does not indicate, however, that the market is inactive, for there is a good inquiry for structural shapes of all kinds, heavy rails, billets and pig iron, the latter for prompt shipment. Hills and furnaces are sold up so tightly that they cannot take care of more business, except for delivery after the middle of next year, and consequently a large tonnage has to be turned down every week. Specifications are also coming in more freely for iron and steel bars, both heavy and small sizes. The largest producer of sheets is finding a good demand for its product, but independent manufacturers and jobbers report a different state of affairs. The demand for wire and nails continues to improve, and a good business is also being done in merchant pipe, though prices are shaky. Scrap iron continues weak, as a result of large offerings and little buying.

PIG IRON.—The virtual settlement of the strike in the anthracite coal fields and the return to work of the striking miners in Alabama, has had a wholesome effect upon the local market. A feeling of confidence has returned to melters which is evidenced in the comparatively little buying that has been done during the past week. Salesmen report that inquiries and orders have fallen to a minimum, and that foundrymen now seem disposed to wait for future developments, believing that with the opening up of the coal mines and the gradual resumption of work at the furnaces, contract iron will be shipped as per specifications. The Tennessee furnaces have gone in blast again, also the local furnaces that were banked for want of fuel, and foundrymen are receiving better shipments on their orders than for several weeks. It is almost certain, however, that there will be another pig iron shortage before the close of the year, which will be due to a lack of cars and motive power. The railroads have already informed a number of commission houses that all available cars will be shipped east to the coal fields, and will be kept in the coal traffic until the wants of the country have been fully satisfied. Sellers of foreign iron also report that, outside of the iron already on the way, it is doubtful if more will be imported for some time, as they cannot get bottoms in which to carry it, the heavy importations of coal having increased ocean freights and absorbed tonnage. There have been sales of a few thousand tons for future delivery and of about 1,000 tons for prompt shipment. Spot iron stills commands high prices, 100 tons, containing 3 to 3½ silicon, having been sold at $29.50, Chicago, several days ago. No. 1 foundry is still held at $27.65, and No. 2 at 50 cents to 75 cents less. Chicago quotations for future delivery are as follows:

Lake Superior Charcoal	$26 00 to 28 00
Local Coke Foundry No. 1	23 50 to 24 00
Local Coke Foundry No. 2	23 00 to 23 50
Local Coke Foundry No. 3	22 50 to 23 00
Local Scotch Foundry No. 1	24 00 to 24 50
Local Scotch Foundry No. 2	23 50 to 24 00
Southern Coke No. 1	24 15 to 24 65
Southern Coke No. 2	23 65 to 24 15
Southern Coke No. 3	23 15 to 23 65
Southern Coke No. 4	22 65 to 23 15
Southern No. 1, soft	24 15 to 24 65
Southern No. 2, soft	23 65 to 24 15
Southern Gray Forge	21 65 to 22 15
Southern Silveries	25 65 to 26 15
Jackson Co. Silveries	29 00 to 30 00
Ohio Strong Softeners	25 60 to 26 10
Alabama Car Wheel	27 15 to 27 65
Malleable Bessemer	25 00 to 26 00

BARS.—New business is comparatively light, though specifications are more active. Manufacturers of steel bars report that the demand for both heavy and light sizes is about equal. Weakness in the price of bar iron is still felt. We quote mill shipments, Chicago delivery, Bessemer steel, 1.75c to 1.85c; angles, less than 3x3, 1.85c to 1.95c, base; iron, 1.85c to 1.95c; hoops, 2.15c. Prices out of store, steel, 2c to 2.10c; iron, 2.20c to 2.25c; hoops, 2.40c to 2.50c; angles, 2.50c to 2.60c.

SHEETS.—The market is gradually resuming a tone of strength, consumers showing more confidence in the stability of present prices. The leading producer reports a good demand for sheets of all gauges, though independent mills and jobbers are not quite so well off. We quote No. 27 black, mill shipments, Chicago delivery, 2.80c to 2.90c; galvanized, 3.95c to 4.05c; out of store, No. 27 black, 3.05c to 3.15c; galvanized, 70, 10 and 5 percent.

STRUCTURAL MATERIAL.—Orders placed with mills have been light during the week, though there has been a good demand from stock. Contracts have been let for the addition to the Hartford building, of this city, the order for the structural work going to the Brown & Ketcham Iron Works, Indianapolis. About 500 tons will be required. Contracts for other buildings to be erected in the near future, have been let to local contractors, calling for nearly 1,000 tons of structural shapes, all of which will come from stock. We quote mill prices, as follows: Beams, 15 inches and under, 1.75c to 1.95c; 18 inches and over, 1.85c to 2c; structural angles, 3x3 to 6x6, 1.85c to 2c; angles, channels and tees smaller than 3 inches, 1.85c to 2c base. Prices on lots from stock 2¼ to 3½ cents per pound.

BILLETS.—There continues to be a good demand for billets, though mills are able to meet only a small part of it. No sales of foreign billets are reported. We quote open-hearth billets, $36 to $38; forging billets, $38 to $40.

RAILS AND TRACK SUPPLIES.—Mills are sold so far ahead for next year that much business has to be refused on account of the delivery question. Orders have been placed during the week for several thousand tons of heavy rails. There is a good demand for track supplies and light rails, and the local manufacturer has its books filled for several months in 1903. We quote standard sections, $28; second quality, $27; light rails, 45 pounds, $34 to $35; 12 pounds, $40 to $41, with regular differentials for intermediate sizes; light rails out of store, $45 to $50; track supplies, mill shipments, as follows: Angle bars, 1.90c to 2c; spikes, first quality, 2.50c; second quality, 2.25c; track bolts, 3½x¾, with square nuts, 2.85c to 3c per 100 pounds; with hexagon nuts, 3.05c to 3.20c, with usual differentials for other sizes.

MERCHANT STEEL.—Little new business is being offered, manufacturers not being able to take care of it. We quote mill shipments, Chicago delivery, as follows: Spring steel, 2.65c to 2.75c; sleigh shoe, 1.95c, flat sizes; concave and convex, 2c; out of store, 2.15c; cutter shoe, 2.50c to 2.60c; machinery steel, 2.15c to 2.25c, base; plow steel, 2.50c and upwards, according to quality; toe calk, 2.25c to 2.35c; out of stock, 3c to 3.10c; ordinary tool steel, 6c to 7c; specials, 13c and upwards; less than carload lots, 5 percent to 10 percent higher; cold rolled shafting, carload lots, 47 percent off, Chicago; less than carload lots, 42 percent off, Chicago.

MERCHANT PIPE.—Competition continues keen for the business being offered, and listed prices are being shaded on desirable orders. Jobbers have not been replenishing stock lately, but it is understood this week that the change in discounts soon to be announced will date from Oct. 15, so that large purchases can be made more freely. We quote:

MERCHANT PIPE, RANDOM LENGTHS.

(Jobbers, Chicago Basing Discounts.)

	Black. Percent.	Galv. Percent.
⅛ to ½ in. inclusive	58½	46½
¾ to 12 in. inclusive	65½	53½
(Consumers, Chicago Basing Discounts.)		
⅛ to ½ in. inclusive	56½	43½
¾ to 12 in. inclusive	63½	50½

BOILER TUBES.

Steel.

	Percent.
1 to 1½ in.	35
1¾ to 2½ in.	45
2¾ to 5 in.	55
6 to 13 in.	47½

Iron.

	Percent.
1 to 1½ in.	35
1¾ to 2½ in.	32½
2¾ to 5 in.	42½

CAST IRON PIPE.—This is the dull season of the year, and new business is confined to small orders. We quote 4-inch water pipe, $37; 6-inch and larger, $36; gas pipe, $1 a ton higher.

PLATES.—There is a very heavy demand for both universal and sheared plates, and mills are getting all the business they can take care of. The leading local producer reports orders during the past week aggregating 20,000 tons. We quote mill prices, Chicago delivery, future shipments: Tank steel, ¼ inch and heavier, 1.75c to 2c; flange steel, 1.85c to 2.10c; from stock, tank steel, ¼ inch and heavier, 2.25c to 2.40c; 3-16, 2.35c to 2.50c; No. 8, 2.40c to 2.60c; flange steel, 2.50c to 2.65c. We would note that though there has been no change from the mill price of 1.75c, independent mills able to give prompt delivery are asking not less than 2c to 2.10c for delivery within the next three to six months.

WIRE AND WIRE NAILS.—There is an exceedingly good demand for wire products of all kinds. It is not confined to any one section of the country, but comes from all parts of the west and southwest. We quote prices to jobbers, carload lots, Chicago delivery, as follows: Smooth wire annealed, 1.90c; galvanized, 2.20c; painted barb wire, 2.30c; galvanized barb wire, 2.60c; nails, $2; polished staples, 2.15c; galvanized staples, 2.45c. Prices to retailers are 5 cents higher than above quotations on carload orders, and 15 cents higher on less than carload lots.

COKE.—Large shipments of Colorado coke, have afforded considerable relief to local cosnumers. A little improvement is to be noted in the shipments from the East, but not enough to effect local conditions. Spot coke still commands $12 to $14. Colorado coke sells at about $2 a ton less than Connellsville.

OLD MATERIAL.—The market has become weaker during the past week, due to the heavy offerings from country dealers and railroads and an absence of buying. We have revised our quotations, as follows:

Old Iron Rails	$24 50 to 25 00
Old Steel Rails (mixed lengths)	19 00 to 19 50
Old Steel Rails (long lengths)	23 00 to 23 50
Relaying rails	31 50 to 32 00
Old wheels	21 00 to 21 50
Heavy melting steel	17 50 to 18 00
Mixed country steel	15 50 to 16 00

The following are selling prices per net ton:

No. 1 R. R. wrought	$20 00 to 20 50
No. 2 R. R. wrought	18 50 to 19 00
Shafting	19 50 to 20 00
Dealers' forge	16 50 to 17 00
No. 1 busheling	14 00 to 14 50
No. 1 Machine Cast	16 50 to 17 00
Railroad Cast	15 50 to 16 00
Railway malleable	16 00 to 16 50
Country malleable	14 50 to 15 00
Iron axles	24 00 to 24 50
Steel axles	20 00 to 21 00
Cast borings	10 50 to 11 00
Wrought turnings	13 50 to 14 00
Iron axle turnings	14 50 to 15 00
Steel axle turnings	13 50 to 14 00
Stove plates	11 50 to 12 00
Old iron splice bars	20 50 to 21 00

CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Oct. 22.

The railroads are having an increasingly important influence all along the line, causing delays in unloading ore vessels, stopping of furnaces and foundries on account of coke shortage, and retarding the delivery of pig iron and finished material. While it is hoped that the settlement of the great strike will relieve the present congestion in time, there seems to be no reason for believing that relief will be immediate. Keen interest is felt in Cleveland in the meeting of Southern manufacturers of pig iron to be held in New York, Friday, to fix the prices of the Southern product for the second half of 1903. It is earnestly hoped that a conservative influence will prevail, as it is recognized that the grave danger to be avoided is the placing of prices so high that consumption will be checked and the market demoralized.

IRON ORE.—The freight rate has been advanced from 75 cents to 80 cents from Duluth. There has been no change in the rates from Marquette and Escanaba, but tonnage is very scarce at the latter port and an increase of five cents per ton is expected. Dispatch has been very poor, especially in the case of vessels bringing cargoes for direct shipment to the furnaces. Some of the large vessels are now detained ten days before cars can be obtained to take the ore. A few of the smaller vessels have been tied up for the winter.

COKE.—The coke situation seems to be growing worse. One large Cleveland concern which employs 400 men has been closed for a week on account of inability to get coke. The manager made a trip to Pittsburg and begged for coke. He was informed that it was simply impossible to get cars and locomotives and that no promise could be made except that there would be no discrimination. The banking of furnaces continues and linings are being seriously damaged.

PIG IRON.—A number of orders for Scotch iron were placed at $25.50 for No. 1, Eglinton and $24.50 for No. 2, duty and freight paid. The Nova Scotian iron has not yet arrived on account of delay in getting vessels to carry it to Boston. Foundrymen are having very little trouble with the Scotch pigs except that it is necessary to break them. Prices of castings are being raised to conform to the cost of iron and fuel and customers are not complaining. There is now a great deal more talk about crowding deliveries than about selling. Owing to frequent suspensions of furnaces on account of coke shortage, some furnaces can not now guaranty iron for delivery before September. With neither buyers or sellers anxious to make contracts little business is being done. We quote as follows for shipment in the first half of 1903:

Bessemer	$21 75 to 22 25
No. 1 Strong Foundry	23 00 to 23 50
No. 2 Strong Foundry	22 50 to 23 00
No. 3 Foundry	21 75 to 22 25
Scotch No. 1	23 00 to 23 50
Scotch No. 2	22 50 to 23 00
Gray forge, Valley	20 50 to 20 75
Lake Superior Charcoal	25 00 to 26 00

FINISHED MATERIAL.—In spite of the recent reduction in prices of sheets, dullness in the market continues buyers apparently believing that there would be further reductions. Within a few days, however, advices received in this city from the East give positive assurance that there will be no further change in prices so far as the principal producer is concerned, and it is not thought that other companies, already selling at small profit, will do any cutting below present prices. We quote 2.10c to 2.15c, Cleveland, for 3-16 inch sheets and heavier. Cleveland prices on mill sales of black sheets to consumers are as follows: No. 24, 2.65c to 2.75c; No. 26, 2.75c to 2.85c; No. 27, 2.85c; to 2.95c; and the following prices out of stock: No. 10, 2.35c to 2.50c; No. 12, 2.45c to 2.60c; No. 14, 2.50c to 2.60c; No. 16, 2.55c to 2.70c; Nos. 18-20, 2.75c to 2.90c; Nos. 22-24, 2.85c to 3c; Nos. 25-26, 2.95c to 3.10c; No. 27, 3.05c to 3.20c; No. 28, 3.15c to 3.30c. On galvanized sheets we quote mill sales in carload lots, Cleveland, as follows: Nos. 10 and 11, 2.60c to 2.75c; Nos. 12-14, 2.70c to 2.85c; Nos. 15-17, 2.80c to 2.95c; Nos. 18-21, 3c to 3.15c; Nos. 22-24, 3.30c to 3.45c; Nos. 25-26, 3.55c to 3.70c; No. 27, 3.80c to 3.95c; No. 28, 4.05c to 4.20c; No. 29, 4.45c to 4.60c; No. 30, 4.95c to 5.10c. Galvanized sheets out of stock are quoted 75 and 2½ off.

The withdrawal from the market of the principal producer of plates, as announced last week, has enabled other companies to pick up some nice business at good prices. There has been a rumor afloat that the withdrawal of the principal producer was not entirely in good faith, but that the announcement was made in order to give the company an opportunity to quietly take some advantageous orders. There does not appear to be any foundation for

this rumor, as the company seems to be entirely out of the market on plates until it can guarantee satisfactory delivery. While the pool price remains at 1.70c, Cleveland, for tank steel, plates can not be had for less than 2c for delivery this year and 2.10c is the usual price. In spite of many rumors of cutting on iron bars, careful inquiry shows that prices are well maintained, although there may be occasionally lopping off of extras. Sales out of store Cleveland, are at the rate of 2c for iron and 1.90c to 2c for steel, while from 2.10c to 2.25c is paid for large rounds. We quote steel bars at 1.60c for Bessemer and 1.70c for open-hearth, Pittsburg; bar iron at 1.80c, Pittsburg. The demand for shapes continues strong and it is difficult to insure prompt delivery.

OLD MATERIAL.—The market has been quiet, but the demand for machine cast scrap and stove plate plate is strong. Machine cast is scarce. We quote Cleveland prices unchanged, all gross tons, as follows:

Old iron rails	$25 50 to 26 50
Old steel rails (over 6 feet)	22 00 to 23 00
Old steel rails (6 feet and under)	21 00 to 22 00
Old car wheels	20 00 to 21 00
No. 1 R. R. wrought scrap	23 50 to 24 00
Mill scrap	19 50 to 20 00
No. 1 machine cast scrap	20 00 to 21 00
Iron axles	29 00 to 30 00
Steel axles	28 00 to 29 00
Axle turnings	18 50 to 19 50
Wrought turnings (free from cast)	16 00 to 17 00
Cast borings	12 00 to 13 00
Uncut wrought iron boilers	12 00 to 13 00
Steel boiler plates	17 00 to 18 00
Grate bars	12 00 to 13 00
Pipes and flues (clean)	17 50 to 18 50
Tank iron	17 00 to 18 00
Hoop and band iron	13 50 to 14 50
Sheet iron	12 00 to 13 00
Wrought drillings	15 00 to 16 00
Malleable iron (railroad)	20 50 to 21 50
Malleable iron (agricultural)	17 50 to 18 00
Stove plate	14 00 to 15 00
Heavy steel	19 00 to 20 00

CINCINNATI.

Oct. 21.

The settlement of the anthracite coal strike encourages hope in the belief that the coke situation will be improved. The scarcity of coke, however, continues unabated, and for immediate delivery fancy prices still obtain. Some few car lots of Kanawha coke have sold during the week at $9 at the ovens, or $10.60 f. o. b. Cincinnati, for immediate delivery. Virginia ovens, which had withdrawn from the market entirely, accepted an order for 16,000 tons for delivery in the first half of next year at $4.50 at the ovens. It was understood that the Kanawha coal operators had offered some concessions to the miners, and they were expected to go to work today. The New River operators have called a meeting for today, so that conditions point to a settlement of the strikes in these districts. As the Alabama miners have gone back to work the coal strike troubles appear to be nearing an end. In pig iron the situation shows but little change and deliveries are not coming forward any more freely. The demand for spot iron and coke comes from consumers, who have been disappointed on old contracts. However, the urgent call for spot iron is not so marked as in the recent past. In some lines of finished material the market shows weakness, and in bar iron and wrought pipe prices are shaded to obtain desirable orders. Old material is firm under good demand.

PIG IRON.—Prices continue irregular, but are generally steady, there being no change in values. The production for the remainder of this year and the first quarter of next year is practically sold, although some furnaces are offering deliveries in this period above current rates. Orders have been fewer and tonnage somewhat smaller the past week. Spot No. 2 foundry is scarce but there have been some sales at $25.25 f. o. b. Cincinnati. For delivery in the second quarter of 1903 Southern No. 2 foundry sells mainly on the basis of $20, Birmingham, while Virginia irons are still obtainable at the equivalent of $19, Birmingham. While inquiries continue for prices covering deliveries in the second half of 1903 no trades have been reported. A conference between the railroads and furnace representatives held in Birmingham, Oct. 14 and 15, resulted in the following agreement in regard to freight rates: On sales made between Jan. 1 and June 1, 1902, rates in effect at date of sale will be protected up to Dec. 31, 1902. Sales made between June 1 and Sept. 4, 1902, rates in effect at date of sale will be protected to Dec. 31, 1902. All sales made on and after Sept. 5, 1902, rates in effect Sept. 15 will be protected to March 15, 1903, but not later. No refund of rates already collected shall be made. This applies to pig iron, cast iron pipe and billets. There is a fair inquiry for Bessemer iron, and a sale of 1,000 tons is reported on the basis of $22.75 at furnace. The depression in wire and nails and the closing of some mills have brought out some Bessemer for spot delivery, which has gone to car wheel and malleable foundries. Prices f. o. b. Cincinnati for delivery after Jan. 1, are as follows:

Southern Foundry No. 1	$23 75 to 24 25
Southern Foundry No. 2	22 25 to 23 25
Southern Foundry No. 3	22 25 to 22 75
Southern Foundry No. 4	20 75 to 21 50
Southern Foundry No. 1, soft	23 75 to 24 25
Southern Foundry No. 2, soft	22 25 to 23 25
Gray Forge	20 00 to 21 00
Northern Foundry No. 1	26 10 to 26 60
Northern Foundry No. 2	25 10 to 26 10
Southern car wheel iron	28 00 to 29 00
Malleable coke iron	25 00 to 25 75

FINISHED MATERIAL.—At the prices reached by the recent decline in sheets the market is steady. In bars an easier tone has developed and there is some shading of prices. Buyers are so well provided with contracts that jobbers find it difficult to place orders, except at concessions. While this is the situation at present it is not believed probable that the dullness of the market will result in any considerable reduction in prices. It is argued by bar iron producers that they have held their price down in the face of an advancing market for raw materials. It is recalled that in 1899 bar iron advanced to $2.28 per hundred base, half extras, Cincinnati, while in the advance of 1902, when it was expected like prices would be reached, the asking figure was never higher than $1.92, notwithstanding the advance in pig iron and other raw materials which enter into the manufacture of bar iron. As several large consumers of bars are expected to come into the market in the near future it is believed by some that the market will steady and prices will be maintained. In wrought pipe the discounts are changed to cover prices at which current business is being transacted. While the leading interest has quoted no decline in values independent concerns have become enough of a factor to cause weakness in the general situation. In black sheets sales of No. 10 are at 2.50c and of No. 12 at 2.60c out of store. Mill prices on No. 10 are 2.17c; No. 12, 2.27c for blue annealed steel. Tank plates out of store are quoted at 2.30c for ¼ inch, and 2.40c for 3-16 inch. Prices for bar iron in carload lots are: 1.92c base, half extras f. o. b. Cincinnati; steel bars, 1.72c base, half extras f. o. b. Cincinnati. Both are retailed at 2.20c base, full extras, out of store. Beams are selling at 3c retail and angles and channels at 2.40c for base sizes. Wrought pipe and boiler tubes are quoted as follows for carload lots f. o. b. Cincinnati:

WROUGHT PIPE.
(Basing Discounts.)

	Black. Percent.	Galv. Percent.
⅛ to ½ in. inclusive	58.8 & 10	46.8 & 10
¾ to 12 in. inclusive	65.8 & 10	53.8 & 10

BOILER TUBES.

	Steel. Percent.	Iron. Percent.
1 to 1½ in.	43.8 & 2½	41.3 & 2½
1¾ to 2½ in.	56.3 & 2½	38.8 & 2½
2¾ to 5 in.	61.3 & 2½	48.8 & 2½
6 to 13 in.	56.3 & 2½	38.8 & 2½

OLD MATERIAL.—The market continues firm with offerings readily taken. Old axles and car wheels are scarce but not quotably higher. Quotations are unchanged. We quote:

Old No. 1 Wrought Railroad, net tons	$21 00
Cast Machine and Foundry, net tons	$17 00 to 17 25
Old Iron Rails, gross tons	25 00 to 26 00
Old Steel Rails, gross tons	24 50 to 25 00
Old Short Lengths, gross tons	18 00 to 18 50
Old Iron Axles, net tons	29 00
Old Iron Car Wheels, gross tons	22 00
Stove Plate, net tons	11 75 to 12 00
Wrought Turnings, net tons	16 00
Cast Borings, net tons	11 00

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM NO. 150 NASSAU ST., Oct. 21.

PIG IRON.—Delevopments in the local pig iron market during the past week were almost entirely confined to foreign irons. At the present time, according to sales agents of foreign producers here, no steamers can be engaged to bring iron to this country from the British Isles before Nov. 29 at the earliest, and the majority of steamship in-

terests will not promise engagements of steamers before the middle of December. This condition has considerably upset the calculations of those who had immediate wants to supply. Because of the many steamships that have been pressed into service in bringing coal to this country ocean freights are fully 50 cents higher than they have been for months past, but foreign interests are apparently standing the advance rather than charge it to their American customers. The belief is strong, however, that with the settlement of the anthracite coal strike, and with the increased supply of domestic coals that will shortly be available, many who had gone into foregn markets for coal will resell there what they have purchased, so that steamers which have heretofore heen utilized to bring iron to this country, will again engage in that service. At the present time Middelsbro No. 3 is selling at from $20.50 to $21, delivered in New York, in large lots, while for smaller quantities prices average from 50 cents to $1 per ton more. The best brands of Scotch irons command as high as $25, New York delivery, but for the average best grade, that is most in request, $23.50 is the basis. Another feature of the foreign iron market during the week was the large number of inquiries made for delivery next year. Foreign producers, however, have not opened their books for next year, and declare that they will not do so until they know definitely what freight rates the new shipping combine intends to impose.

There is practically nothing to be said on domestic irons. Concerning the Tennessee Coal, Iron & Railroad Co. it is stated that all the furnaces banked recently in consequence of the recent strike are not in blast yet, but will be before another week. Southern interests are still out of the market for next year. So far as the first six months are concerned, evidence accumulates that nearly all the companies have already sold all they can produce. Sales of No. 2 foundry in small quantities are reported, and at prices ranging from $20 to $22 at Birmingham. With a $4.25 freight rate to New York little Southern will sell at the above figure, foreign irons at present prices easily having the call. Northern furnaces are more concerned with making deliveries on old contracts than they are in booking business for next year, and as a result very few orders are being placed. The fuel situation hereabouts still continues to hamper the operation of foundries, but there are reports that better shipments of coke can be counted upon in the near future. New York prices for 1903 delivery, nominal, are as follows: Northern, No. 1 X, $23.50 to $25; No. 2 X, $22.75 to $23.50; No. 2 plain, $22.25 to $22.50; Southern foundry No. 1, $23 to $23.50; No. 2 foundry, $22.25 to $22.75; No. 3 foundry, $21.50 to $22; No. 4 foundry, $20.25 to $21.25.

Finished Iron and Steel.—The chief feature of the structural material market is the increasing tendency of railroads to provide for next year's requirements. Inquiries with this object in view have been made in large numbers during the past week. The New York Central Railroad a few days ago, made a contract for its requirements for next year with the American Bridge Co., which latter announces that it has some railroad contracts on its books that cannot be executed before well into 1904. Another large contract recently secured by the America Bridge Co. was for all of the structural work to be used in the Wells, Fargo & Co.'s new building on Broadway, this city, and which represents a large tonnage. Official denial has been made by the United States Steel Corporation of the report that the United States Realty & Construction Co., of Boston, had made arrangements to purchase the whole of their structural steel output, apart from that required by the American Bridge Co., and to the exclusion of other outsiders. Sheets still continue to exert a depressing influence on the finished material market, and lower prices, especially among small jobbers, are recorded. In all other finished products good business is reported. New York prices are as follows: Beams and channels, 15 inches and under, 1.75c to 1.90c; angles, 3 to 6 inches 1.75c to 1.90c; zees, 1.75c to 1.95c; bulb angles, 2.05c to 2.35c; deck beams, 2.05c to 2.25c; sheared steel plates, tank, 2.10c to 2.15c; flange, 2.25c to 2.30c; fire box, 2.30c to 2.50c; refined iron bars, 1.95c to 2c; soft steel bars, 1.95c to 2.10c; steel sheets, in carloads, New York, No. 28, black, 3.05c to 3.20c; galvanized, 75 and 5 off.

PHILADELPHIA.

Oct. 21.

Now that the strike is settled, hope is entertained that normal conditions will soon be established, but the prospect is far from being as clear as might be wished and, with so much depending upon transportation, it can not safely be predicted whether conditions in the near future will be better or worse. Indications are that prices will not be higher. Foreign iron has an important influence in fixing the price for iron in the seaboard markets. It can be had at about $22, duty paid, and its importation will prevent prices of domestic from going higher. A drop in prices which would shut out foreign iron may come after home furnaces are able to run regularly.

Pig Iron.—Prices are the same as last week. Many small sales are being made. We quote Middlesboro No. 3, cargo lots, $19.50; small lots, $20.50 to $21; Scotch, $22.50 to $23.50. American as follows for first half of next year: No. 1 X foundry, $23.50 to $24.50; No. 2 X foundry, $22 to $22.50; No. 2 plain, $21 to $22; Standard gray forge, $19.50 to $20.50; basic, $20.50 to $21.

Finished Material.—Market is moderately active. Plates are very strong and high prices are commanded for early delivery. Shapes are easier on account of foreign material coming in. Steel bars are also easier and it is reported that independent mills are cutting on iron bars. We quote as follows: Plates, small lots, 2.10c to 2.15c; carload lots, ¼ inch and thicker, 2c to 2.05c; universals, 2c to 2.05c; flanges, 2.10c to 2.20c; firebox, 2.25c to 2.30c; marine, 2.30c to 2.35c. Shapes, prompt delivery, 2.15c to 2.40c; deferred, 1.75c to 1.80c. Steel bars, 1.72c. Bar iron, 1.92c to 1.97c for carload lots. Old Material—Mills are not likely to have much better fuel supplies for a week or two and scrap is not in strong demand. We quote as follows: Old steel rails, $21.50 to $22; miscellaneous heavy steel scrap, $20.50 to $21.25; low phosphorus scrap, $27 to $28; old steel axles, $26.50 to $27.50; old iron axles, $30 to $31; old iron rails $24 to $25; old car wheels, $19.75 to $20.25; choice scrap R. R. No. 1 wrought, $24 to $24.50; country scrap, $21 to $22; machinery cast, $19.50 to $20; No. 2 light scrap, forge, $16.50 to $17; No. 2 light scrap, ordinary, $15 to $16; wrought turnings $16 to $17; wrought turnings, choice heavy, $18 to $18.50; cast borings, $10 to $10.25; stove plate, $15.50 to $16.

BIRMINGHAM, ALA.

Oct. 21.

Some sales for the first half of 1903 have been made on a basis of $20 and $21 Birmingham for No. 2 foundry. Some little iron of the lower grades has been sold for immediate delivery, No. 4 foundry and gray forge bringing, it is understood, $18 to $19. Some few lots of No. 1 soft have sold at about $25, Birmingham. Very few of the local foundries purchase their supplies of iron in advance, and owing to the crowded condition of the furnace companies' order books, it has been a difficult matter for some of the shops in the district to keep supplied. It is announced that Rogers, Brown & Co. will receive quite a lot of Scotch iron at Southern ports, and that this would be distributed to relieve the situation somewhat. There is demand for a great deal more coke than is available, and it is understood some orders have been booked for shipment to Cincinnati and St. Louis, and other points out of the territory usually supplied with Alabama coke. The prices on coal have been marked up from 25 to 50 percent on account of the scarcity of bituminous coal in the East, and the scarcity in the daily supply occasioned by the strike of 4,500 of the Tenessee company's miners, which was settled last week.

There is considerable activity in building of all kinds here. It is announced that the Alabama Steel & Wire Co. has closed all contracts for the erection of one furnace stack and also for the erection of a steel plant. It is now generally believed that they will locate the blast furnace and steel mill at Bessemer, near which point they have acquired coal lands and are now erecting a large number of coke ovens.

The Metal Market.

NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1909, No. 150 NASSAU ST., Oct. 21.

PIG TIN.—After opening with the weak prices that have characterized it for weeks past, the pig tin market during the current week developed unexpected strength yesterday, when spot reached the highest price it has scored in several weeks, sales having been made at 27¾c. The advance while largely due to the scarcity of stocks, was helped along, first by short interests abroad being forced to cover, and secondly by manipulation on the part of a leading New York interest. Today the market for spot was steady to strong, and the net results only amounted to the loss of one quarter of a cent in comparison with yesterday's highest prices, the closing price being 27½c. The London market during the week reflected this market in a large measure. Spot sold as high as £121 10s, and the lowest price recorded was today's closing, which was £120 10s. Futures show a tendency to weaken. Arrivals at Atlantic ports this month up to date amount to 1,498 tons, with 825 tons afloat, and due here during the next two weeks. Closing prices today at the Metal Exchange were as follows: Spot, 27½c to 27¾c; October, 26.80c to 26.95c; November, 26c to 26.25c; and December, 25.25c to 26c. London closing: Spot, £120 10s; futures, £119.

COPPER.—The market during the past week opened lower, but during the past two days prices have advanced in consequence of buying by consumers to meet their wants in the near future. The increase in supplies continues without any abatement, and hangs like a pall over the market, especially when any bull movement is attempted. The market is unsettled to a pronounced degree, and in many cases, nominal quotations alone are obtainable. It was very little interest manifested in the situation. It was thought that the settlement of the coal strike would bring about a better feeling, and result in lifting the lethargy that has been observable in the market for weeks past, but expectations entertained in both directions have not materialized. The London market after advancing to £53 5s for spot declined to £52 11s 3d. The total exports for the month to date aggregate 7,470 tons. Closing prices today at the Metal Exchange were as follows: Lake, 12c nominal; electrolytic, 11.80c sellers; casting, 11.75c sellers, and standard, 11c nominal. London closing, for spot, £52 11s 3d.

PIG LEAD.—No change has taken place during the week, and sales are being made at 4.12½c for lots of 50 tons or more. In St. Louis the market has been firm, with trading along limited lines. The London market has been quiet and unchanged. Futures rule at 4.10c.

SPELTER.—Very little activity is noted in the market, supplies still being quite restricted. Prices here have averaged about 5½c, and in St. Louis at 5¼c. The London market suffered a temporary weakness during the week, and declined to £19 2s 6d.

ANTIMONY.—No change has taken place. Under a moderate demand Cookson's has been selling at 9½c, Hallett's, at 7¾c, and other brands at 7¼ to 7½c.

NICKEL.—Unchanged. Prices average 40 to 60c, according to quantity.

QUICKSILVER.—Jobbers only are in the market, and sales have been made on the basis of $48 per flask in lots of 100 flasks. London, £8 15s.

CHICAGO.

OFFICE OF *The Iron Trade Review*,
519 MONADNOCK BLOCK, Oct. 21.

Owing to the speculation in both copper and pig tin, prices on both these metals have advanced during the week. Demand is only fair.

We quote jobbers' price to consumers as follows: Lake copper, carload lots 12¼c; less than carload lots, 12½ to 12¾c. Pig tin, 29c; pig lead, carload lots, 4.10c; less than carload lots, 4½c. Sheet zinc, carload lots, 6½c, and 6.65c in lots of 600 pounds. Spelter, carload lots, 5.35c; less than carload lots, 5¾ to 6c. Antimony, 10¾ to 11c for Cookson's and 9¾ for Hallett's in small quantities. Nickel, 55c to 65c, according to size of order and delivery. Inquiry for old metals is good. Selling prices of dealers are as follows: Copper wire, $10.50; heavy copper, $10.50; light copper, $9.50; red brass, $10.75; yellow brass, $8.25; light brass, $6.75; lead pipe $3.90; zinc, $3.75.

LAKE SUPERIOR IRON MINES.

The Shenango Furnace Co., of Pittsburg, with offices in the Frick Building, operating three furnaces at Sharpsville, Pa., has just closed a lease for the Webb mine, a new property located at Hibbing, Minn. In addition the property of Little & Prindle in township 57, Itasca county, Minn., has been purchased and operations on both properties will be carried on on an extensive scale. It is estimated that these two properties contain no less than 20,000,000 tons of ore. While the Shenango Furnace Co., at present, owns and controls all the mines required to operate its furnaces, the additional ore capacity has been secured to enable the company to carry on extensive operations in pig iron, the ore to be furnished to independent furnaces and pig iron taken in return.

The annual report of John Worden, inspector of mines of Iron County, Michigan, has just been published by the Diamond Drill, Crystal Falls, Mich. It is for the year ending Sept. 30, 1902. The following table shows the names of the mines in the county, output in gross tons and men employed.

	Output from Sept. 30, 1901 to Sept. 30, 1902.	Men Employed.
Gibson	Exploration	40
Michigan	43,180	65
Hemlock	145,000	120
Mansfield	58,769	135
Armenia	88,000	95
Hope	4,264	25
Bird	Exploration	Idle
Hilltop	Closed	Idle
Great Western	Shaft sinking	115
Crystal Falls	200,000	120
Lamont	25,000	45
Bristol	116,200	95
Tobin	60,000	80
Columbia	85,022	120
Monongahela	Exploration	25
Dunn	Shaft sinking	25
Baltic	92,380	100
Caspian	Exploration	25
Riverton	79,399	125
Dober	84,748	110
McGillis	Exploration	Six Mo.
Hiawatha	63,000	65
James	Exploration	30

The Duluth, Missabe & Northern Railroad will have 400 new steel ore cars of 100,000 pounds capacity for next season's work.

Work on the resumption of operations on the Commodore mine, Mesabi range, has been begun after two years' idleness. It is the intention to take out all the old machinery, boilers, etc., and install new machinery. Then it will be necessary to unwater the mine.

Iron Ore, of Ishpeming, Mich., in an extended article on the Winthrop properties, Marquette range, says in part: "There are now employed by the mines of the Oliver Iron Mining Co., which is a branch of the United States Steel Corporation, a working force of 410 men, these being engaged in the open pit and underground properties. The company is operating two large open pits. It possesses three, but one of these, No. 4, located close to the mine office, is now idle. The stripping grew so heavy that the company was forced to abandon it for the time being. Ores of similar grade were also possessed in abundance in deposits lying a short distance further south. The largest of these is being worked under the name of 'No. 3 Pit.' It has a length of about 400 feet, is 150 to 200 feet wide, and the stopping face is about 60 feet. Up to within recently there was little stripping to do to prepare the ore for mining, but as they extend operations westward the drift grows heavier until they now have something like 15 to 18 feet to handle. * * * No. 5 pit, a few hundred feet to the southeast of No. 3, is one upon which work was only fairly begun last year. The ore is of the silicious class, similar to that of No. 3, with probably a trifle less iron per ton of material. At the underground mines, the principal product has for some time come from the east end of Section

21, which has been a persistent deposit. They have the shaft 40 feet below the 700-foot level. The most of the ore here is obtained from the 640-foot level, and is won on the settling, or caving plan, the top following nicely. On the 700-foot level they have everything ready for mining, it being the plan to have one level always opened ahead of the one upon which the principal mining is being conducted. At the west shaft, which is working upon an entirely different body of ore, and located 1,100 feet distant, they are working two shifts. There promises to be a fine mine developed at this end of the company's property to the west of the shaft."

For the first time in 18 years a shipment of ore will be made from the Felch Mountain range, Michigan, the ore coming from the Northwestern mine, near Metropolitan. This property is now under lease to Geo. A. St. Clair, of Duluth, and considerable work has been done during the season. The old shaft has been sunk an additional 60 feet and crosscut south 30 feet. From this crosscut drifts have been run east and west 100 feet. All this new work is in ore.

A new record for ore loading on the lakes was made Oct. 16 at Ashland, Wis., when 5,202 tons of iron ore were loaded at the Chicago & Northwestern docks in one hour and eight minutes, the ore being loaded into the steamer James H. Hoyt.

The iron ore find at Highland station, on the Duluth & Iron Range Railroad, 13 miles north of Two Harbors, continues to attract attention among iron men. Prospecting is going forward at a lively rate and business men of Two Harbors have purchased 440 acres, on which they hope to find ore.

The Jones & Laughlin Steel Co. has closed the Monongahela mine on the Menominee range. The boilers and engine will be shipped to Ishpeming. The Monongahela was opened up last year and only about 10,000 tons of ore have been mined, 7,000 tons of which is yet in stockpile.

Three New Blast Furnaces at Monessen.

(Special Telegram.)

PITTSBURG, Oct. 22.—The Monessen Furnace Co., of Pittsburgh, will apply for a Pennsylvania charter on Nov. 3. The applicants are Wallace H. Rowe, Edwin Bindley and Emil Winter, all of whom are at present interested in the Pittsburg Steel Co., which is located at Monessen. The new company will probably be a subsidiary company of that corporation, and will erect and operate three modern blast furnaces with a daily capacity of about 600 tons each. The Garrett-Cromwell Engineering Co., of Cleveland, is said to have plans under preparation for the furnaces. The Pittsburg Steel Co. has a modern open hearth plant in operation at the present time. The erection of the blast furnaces will make the company absolutely independent so far as raw material for the finishing mills is concerned.

The Tin Plate Wage Convention.

(Special Telegram.)

PITTSBURG, Oct. 22.—No vote has yet been taken on the acceptance of the proposition providing for a reduction in wages on rebate tin plate, by the special convention of tin workers of the Amalgamated Association. The delegates have been in session since Monday morning, and representatives of both the American Tin Plate Co. and independent manufacturers have been heard on the proposition. No outsiders were in attendance at the session held this morning, and the delegates are discussing the proposition among themselves. There is little indication that a vote will be had today.

The Fuel Situation Growing Worse.

(Special Telegram.)

PITTSBURG, Oct. 22.—The general freight situation is growing worse. Coke shipments continue very bad to Valley furnaces. Coal mines are also hampered, and to further entangle the situation the Pennsylvania Railroad has to-day issued an embargo on all coal shipments to points east of Altoona, Pa. The main line east of this point is congested with coal trains from the Pittsburg fields, and until these are moved no more cars will be sent beyond Altoona.

A JONES & LAUGHLIN ROAD TO LAKE ERIE.

The Jones & Laughlin Steel Co., of Pittsburg, the largest independent iron and steel producer in the United States, announced this week that surveys have been completed and property purchased for the erection of its own railroad from the company's South Side mills in Pittsburg to Lake Erie. Work on surveys has been progressing for the past six months and only recently was a suitable site secured on Lake Erie to be used as a terminal for the road. A large tract of land has been secured between Girard, Pa., and the lake shore, Girard being about three miles back from the lake. Splendid harbor facilities are afforded at the mouth of Elk creek. Within less than a year the road will be completed and the steel company will be in position to haul all the ore it requires at its blast furnaces from the docks to be built at Miles Station, which is on the lake shore just north of Girard, to the furnaces in Pittsburg. This move of course further intrenches the company as an independent steel producer and will enable it to compete to a greater advantage.

The road is to be known as the Pittsburg, Niles & Western, and will connect with the Monogahela Connecting Railroad, the Jones & Laughlin line which runs parallel to the Monongahela river and which serves the South Side, Soho and Eliza plants of the company. The road will strike off, possibly through a tunnel in a southwesterly direction and will pass near Carnegie, Pa., then swerving to the northwest will cross the Ohio river at Smith's Ferry by a bridge and will run up the Little Beaver river striking west of Poland, O. It will continue northwest passing west of Youngstown, O., and Girard, O., and will cross the Mahoning river at Niles, O. Some distance below Eagleville, it will turn to the east, crossing Mill Creek and swinging almost directly northeast to Girard Harbor, a total distance of about 125 miles.

Upward of 1,500,000 tons of ore is carried annually from lower lake ports for the company's furnaces and as its steel capacity is now much greater than its pig iron producing capacity it is but a matter of a short time when the blast furnace output will be further increased. This will add to the ore requirements about 750,000 tons a year, which alone will be sufficient tonnage to make the road a paying proposition from the beginning. Furnaces would now be under way but for the fact that material entering into their construction is abnormally high in price and very hard to secure. Engines cannot be had in less than 15 months and when the general situation eases off it is probable that the proposition to increase the blast furnace capacity will be taken up.

Finished material will be carried up on the back haul, and as the road will make connections with the Nickel Plate and the Lake Shore & Michigan Southern shipments can be made both to the east and west at a lower cost than is now possible. During the season of navigation on the Great Lakes finished material will be shipped to Duluth and Chicago by boat, further reducing the freight rates and enabling the company to compete more easily with the iron and steel plants located in the west. An official of the company denied that either blast furnaces or a steel plant would be located at Girard as has been reported. All additions of this character will be made in Pittsburg.

Advance in Iron Boiler Tubes.

(Special Telegram.)

PITTSBURG, Oct. 22.—The National Tube Co. this afternoon announced an advance on iron boiler tubes amounting to about 10 percent. For some time deliveries have been far in arrears on this class of tubing and new business continues very heavy. Discounts on 1 and 1½-nch tubes have been reduced to 36½ percent; on 2¾ to 5-inch tubes to 45½ percent; on 1¾ to 2¼-inch and 6 to 13-inch to 35½ percent.

The coming year will see the greatest activity in the history of the Cascade range. The Moore mine of the Oliver Iron Mining Co., idle for several years, will be operated with a good sized force. The ore will be crushed.

THE IRON TRADE REVIEW

Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.

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OCTOBER 23, 1902

ARBITRATION GAINING GROUND.

Events have moved rapidly in the anthracite strike settlement since arbitration became a real factor in the situation. It is significant that the strike has ended in a decision which one side was ready to make at the beginning, and that 20 weeks of idleness and loss and rioting have passed before the willingness to arbitrate became mutual. The outcome, while directly due to the undaunted spirit always characteristic of President Roosevelt, is really the response of the operators to the pressure of a public opinion that grew with every day's prolongation of the struggle. We are not so much concerned now with details of the attitude, the doings and misdoings of operators and strikers, as with the tremendous impulse given to the principle of arbitration in the settlement of labor conflicts in the United States. Whatever the terms of the award finally made, the miners have already gained what is of incalculable value to them—such a friendly appreciation by the public, of their condition and their aims, as will make it impossible for the lot of an anthracite miner ever to be as poor as it was before tools were dropped on May 12, 1902. Probably never in the history of labor troubles in this country has there been so great unanimity of sentiment in favor of one of the contestants as has developed in the course of this unhappy strike. There was much divergence of view as to recognition of the union and possibly as to the question of hours, but a general feeling, even though not based on thorough acquaintance with existing conditions, that something was due to the miners.

The mistake of the operators was in not conceding that there were some matters at stake which might be submitted to the arbitrament of men of recognized fairness and ability to grasp the situation, even though not miners of coal or owners of coal properties.

The work of the National Civic Federation has not been in vain; neither is that of the Stove Founders' National Defense Association, or of the National Founders' Association. Conciliation and conference are the only permanent basis on which the relations of employers and employes can be saved from constant liability to outbreaking hostility or a forced peace, with neither interest nor friendliness. There are questions which arbitration cannot settle. Recognition of the union in the union sense of recognition is one of them. That every man who works at a trade in which men are organized ought to ally himself with the union, can never be given the force of a principle. And unionism needs to learn that to force men into membership against their will can no more make permanent the control of a given trade than can unjust demands be enforced against an employer after the stress of a full shop is over. Neither is the question of output one to be settled by decree, nor that of piecework or premium plan, or other method of securing the best correspondence between the work done and the price paid for it. Attempts to say what a day's output shall be and what the price for it, will fall as far short of permanent success as the attempts of pools and trusts to say how much shall be produced and how much the consumer shall pay for it.

The most hopeful thing about the anthracite strike outcome is that it has quickened public concern over the barbarity of industrial war. Public men who have advocated arbitration for such disputes have been too often referred to as students of academic questions. The sneer will be less frequent hereafter. And perhaps it was well that the issue came in an industry in which the hurt of such a war would be widespread. The study of the cure will be more energetic.

A GREAT YEAR IN LAKE ORES.

There is still more than a month left of iron ore shipments from Lake Superior for the season of 1902; but the official figures up to Oct. 1 and some knowledge of the program of shippers for October and November make it quite certain that the movement for the year by water and by all rail routes will be close to 25,000,000 gross tons. This is an impressive total and accents anew the commanding importance of the upper lake ranges as the dependence of the great steel interests of the greatest steel-producing country in the world.

In this connection a most significant story is told by the statistics of iron ore and pig iron production in the United States in the past 13 years. We go back to 1889, the first year in which iron ore statistics for the country were gathered by the U. S. Geological Survey. Alongside of the iron ore and pig iron figures for the country we have set the Lake Superior shipments and have figured the percentage contributed by the Lake Superior region:

	Shipments Lake Superior Ores— Gross Tons.	Production Iron Ores in U.S.— Gross Tons.	Percentage of Lake Ores.	Production Pig Iron in U. S.— Gross Tons.
1889....	7,292,643	14,518,041	50	7,603,642
1890....	9,003,725	16,036,042	56	9,202,703
1891....	7,071,053	14,591,178	48	8,279,870
1892....	9,072,241	16,296,666	56	9,157,000
1893....	6,065,716	11,587,629	52	7,124,502
1894....	7,748,312	11,879,679	65	6,657,388
1895....	10,429,037	15,957,614	65	9,446,308
1896....	9,934,828	16,005,449	62	8,623,127
1897....	12,464,574	17,518,046	71	9,652,680
1898....	14,024,673	19,433,716	72	11,773,934
1899....	18,251,804	24,683,173	74	13,620,703
1900....	19,059,393	27,553,161	70	13,789,242
1901....	20,589,287	28,887,479	71	15,878,354
1902, est.	25,000,000	33,500,000	74	17,750,000

The table shows that from furnishing one half of all

the ores produced in the country in 1889, Lake Superior mines are now contributing nearly three-fourths of the total. It will be noted also that while in the first half of the period covered by the table there was a close correspondence between the shipments of Lake Superior ores and the production of pig iron in the country in a given year, the gap between the figures has been widened greatly in recent years.

Another deduction from the table bears on the generally accepted rule that the pig iron production of the United States approximately doubles in ten years. In view of the wide fluctuations that appear in the panic and depression years included by the table, we may take for purposes of comparison the four years beginning with 1889 and the four years beginning with 1899. The average pig iron production in the former period was 8½ million tons and in the latter 15½ million tons, estimating the year 1902 at 17¾ millions.

Considering that the period covered by our table includes the most disastrous five years the business interests of the country have ever seen ,the probabilities for the ensuing decade of our iron and steel history are certainly not such as to inspire pessimism. It is altogether within bounds to calculate on a consumption of Lake Superior ores in the next two decades equal to the 600 or 700 million tons which some authorities estimate as the total of ore now known to exist on the properties thus far developed.

A SPECIAL PLEA FOR WELSH TIN PLATE.

The proposal for a reduction of 25 percent in the wages of tin workers when working on tin plates for export has agitated deeply the Amalgamated Association membership in tin plate plants. Welsh tin plate workers, many of them relatives of tin plate workers on this side, have also been deeply concerned, for the decision of the question means employment or idleness for hundreds of men in Welsh mills. Some bitter correspondence has appeared in the workers' journals. A letter from Swansea, Wales, in the last issue of the *Labor Tribune*, puts the case from the Welsh workers' standpoint. The writer points out that it will be only a question of time when Welsh mills will be equipped on the American plan, permitting of doubling the output, which "will enable us to meet successfully every cut in wages or prices the Americans may make. * * I make no threat, but I warn our brother American tin workers against accepting a reduction of wages upon such flimsy excuses as to capture our trade."

American tin plate workers will have no difficulty in deciding whether "our trade," referred to by the writer, is legitimately Welsh or American. It is Welsh trade in the minds of the Welsh worker and manufacturer because they have long enjoyed the benefits of it. But from the American standpoint no such claim can be recognized. The importation of Welsh tin plate in the United States has only been possible by the drawback provision of our tariff act, a proviso altogether out of harmony with the protective principle, and yet a concession which the friends of recent protective acts were forced to make to placate certain special interests American trade for Americans is a shibboleth which should find no exception in the tin plate industry. In taking the drawback trade in tin plates which now goes to Welsh mills, the tin plate producers of the United States are only taking their own. There can be no just plea, consistent with patriotism or with commercial policy, for continuing to send abroad millions of American money for tin plates which can be rolled at American mills, thereby giving employment to thousands of American workmen at iron mines, blast furnaces, steel works, tin plate mills and the many contributing interests, whose prosperity is dependent upon the tin plate industry. Precisely the same plea went up from Wales when the McKinley tin plate tariff was passed. It is no more valid now than then.

The Orient Coal & Coke Co. is being organized at Pittsburg, with a proposed capitalization of $600,000 for the purpose of carrying on extensive mining and coking operations in the Lower Connellsville region. The promoters of the company have already secured 1,200 acres of excellent coal land in the Lower Connellsville region and operations will be commenced in a short time. A railroad will probably be built from the property to the main line of the Baltimore & Ohio and to the Pennsylvania railroads. As soon as tipples are completed and mining operations commenced the erection of 300 coke ovens will be commenced. Julian Kennedy, Reed Kennedy and other Pittsburg engineers and financiers are interested in the undertaking.

The new furnace which the Carnegie Steel Co. is erecting at its Carrie plant, Rankin, Pa., will be completed within a few months. The two furnaces at Rankin, Pa., will be placed in operation shortly after the first of the year.

The installation of an additional Bessemer converter at the South Side plant of Jones & Laughlin Steel Co., Pittsburg, was made in record breaking time. The converter has a capacity of 10 tons and will greatly increase the production of Bessemer steel at this plant. From the time that operations were commenced for the installation of this converter it required only 53 days until it was placed in operation and the first heat was made. During that time two cupolas were taken down and moved and an additional blowing engine installed. It required 28 days to remove the cupolas and lay the foundations of the engine and in 23 days the engine was set up and was given its first trial.

W. W. Card, formerly secretary and assistant treasurer of the Westinghouse Air Brake Co., Pittsburg, has been appointed third vice president, a newly created office. John F. Miller, formerly assistant secretary, takes the position of secretary and C. E. Little succeeds Mr. Miller.

The Bessemer plant of the Republic Iron & Steel Co. at Youngstown, O., has been closed down temporarily on account of the scarcity of Bessemer iron. The shortage of coke has reduced the production of iron at all the Valley furnaces, and the Bessemer plant will be closed until the pig iron supply is increased.

The F. A. Goodrich Iron & Steel Co., Detroit, has been incorporated with a capital of $50,000, by F. A. Goodrich, J. C. McLauchlan, Wm. Gerhauser and Fred H. Holt.

At the annual meeting of the directors of the Crucible Steel Co., held in Pittsburg this week officers were elected as follows: Reuben Miller, president; Frank B Smith, general manager and assistant to president; Benjamin Atha, first vice president; Robert E. Jennings, second vice president; James H. Park, third vice president; Charles E. Clapp, fourth vice president; Alexander Thomas, secretary; Julius Bieler, treasurer. The following executive committee was also elected: Reuben Miller, chairman; Frank B. Smith, secretary; Benjamin Atha, Robert E. Jennings, W. P. Snyder, James H. Park and A. W. Mellon.

ELECTRICAL HARDENING OF ARMOR PLATE.

(Special Correspondence.)

WASHINGTON, Oct. 21.—Lieut. Cleland Davis, of the Ordnance Bureau of the United States Navy Department, today stated to the correspondent of *The Iron Trade Review* that he and his associates are making gratifying progress in their investigations and experiments in electrical plate hardening by means of the process invented or discovered by Lieut. Davis. It will probably be nearly a year before he will be enabled to make a detailed report to the Chief of Ordnance. The new method of face hardening, designed of course as an improvement upon the latest approved Krupp practice is based on directing heavy currents of electricity upon the armor plate while in heated condition, the action of the current through the carbon and into the plate carrying bodily into the mass of metal a portion of the carbon. The work of Lieut. Davis has proved notable in the advance made in extending the hardening to greater depths below the surface of the plate. The initial experiments have been conducted at the plant of the General Electric Co., at Schenectady, N. Y., and plans are now in hand for a continuation of practical work upon a greater scale at the plant of the Bethlehem Steel Co. and elsewhere. Of primary importance will be the economy of time effected. In the experiments thus far conducted the introduction of carbon which by the Harvey or Krupp process requires from two to three weeks, has been accomplished in approximately five hours. Of vast significance from the standpoint of naval construction is the claim, seemingly well substantiated, that a considerable saving in weight will be made. Lieut. Davis, as the result of preliminary estimates, has ventured the opinion that by the new method it will be possible to secure a reduction of from 20 to 50 percent below the weight of a Krupp plate possessing equal power of resistance. Finally there is to be taken into consideration the problem of cost. Lieut. Davis, speaking on this point today, expressed entire confidence that the new process when utilized for the face hardening of armor will prove as low if not lower in cost than the present plan and he made the claim that for all other purposes—the hard-faced plate for commercial requirements—it will be possible to reduce cost far below the present basis.

The satisfactory outcome of a ballistic test of a 5-inch plate produced at Bethlehem, following the experiments at Schenectady, led the Navy Department to proceed with the development of the process in the most exhaustive manner. The only unsatisfactory feature of the initial undertaking at the Bethlehem plant was found in the irregularity of the hardness of the plate experimented with. This, Lieut. Davis maintains, if not entirely overcome, will be rendered of no consequence by the maintenance of a minimum depth of hardening.

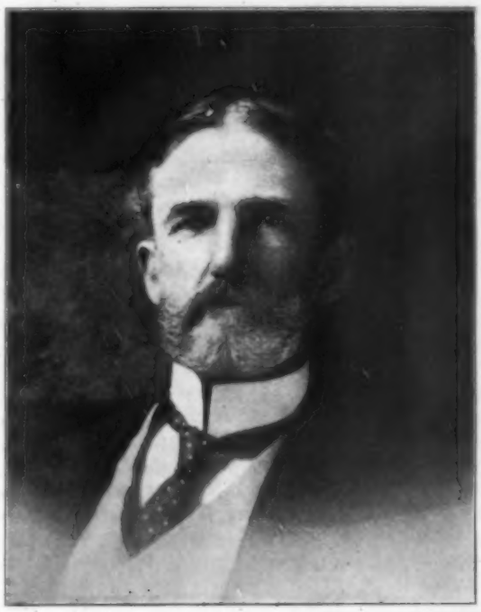
Special Rates on Southern Iron.

(Special Correspondence.)

BIRMINGHAM, ALA., Oct. 20.—The meeting of the Southern Iron Committee held in this city, Oct. 14, was of considerable importance to the iron makers of the district. Traffic officials of the different Southern roads were in attendance and heard the request of the iron makers that the advance of 50 cents per ton in freight rates to points north of the Ohio river be postponed until Jan. 1, 1903. The rates were advanced Sept. 15, and the makers of iron claimed that owing to numerous difficulties encountered the past nine months in the operation of their plants, they had been delayed in making deliveries of iron on old contracts on which protection of rates had expired. They also stated their position as to sales made at low prices prevailing the early part of the year, on a delivered basis, for delivery up to and including the month of December. After considerable discussion, it was agreed late in the day that on all sales made prior to June 1 and regularly registered, the rate in effect at the time of the sale would be protected until Dec. 31, 1902, and that on sales made between June 1 and Sept. 5, the rates then in effect would be protected until the end of the year—it being understood that in no event would the committee grant protection on any sales made since Sept. 15, or that may be made later in the year, beyond March, 1903.

OBITUARY.

Robert Cumming Schenck, president of the Dayton Malleable Iron Co., and one of the most prominent citizens of Dayton, O., died in Faxton hospital, Utica, N. Y., on Tuesday, Oct. 14. Death was the result of exhaustion following an operation. Mr. Schenck and members of his family had spent the summer in the Adirondacks and when his illness assumed a serious form he was taken to the hospital at Utica. He was born at Franklin, O., Oct. 2, 1845. Graduating from Miami University in 1864, he entered the Union service, being on a gunboat during the Kirby Smith raid and in the militia at the time of the John Morgan raid. In May, 1864, he enlisted in the 146th O. N. G. and served during the campaign in the West Virginia mountains. In 1866-7 Mr. Schenck studied law, and in 1868 began practicing. He retired two years later and spent considerable time in Europe. He formed the American District Telegraph Co., which introduced the telephone in Dayton. Mr. Schenck was employed two years in the United States government service, being chief deputy and cashier in the Third Internal Revenue office. In 1880, he formed a partnership with Charles Wuichet, it being known as the National Cornice Works. A little later he became president of the Dayton Malleable Iron Co. He was also a director of the Columbia Insurance Co., president of the Dayton National Bank, and a director of the C. H. & D. Railroad.



THE LATE ROBERT C. SCHENCK.

Sidney H. Short, formerly of Cleveland, and lately manager of the British Motor Co., at Preston, Eng., died Oct. 21, in a London hospital after an operation for appendicitis. Mr. Short had had a brilliantly useful career and his demise at the age of forty-five is most untimely. He graduated from the Ohio State University in 1877 and made improvements in the telephone and the arc lamp at that time. After building electric railroads in Denver, Columbus and West Virginia, he organized the Short Electric Railway Co. and on its absorption by the Brush Co. Mr. Short became associated with the Walker Mfg. Co. Later this concern was sold out to the Westinghouse interests and Mr. Short went abroad. His work in the production of gearless motors for direct application to car axles was a decided advance in electrical engineering and his other inventions are of a like progressive and original character.

The Bethlehem Steel Co. is now rolling angles at its South Bethlehem, Pa., mill. The following sizes are rolled in 100-foot lengths, ranging in thickness from ⅜ inch to 1 inch; 6x6, 6x4, 5x3½, 4x4, 3½x3½, 4x3½. The following are rolled in 30-foot lengths: 3x3 (from ¼ to 11-16 inch thick), 2x2 (from ¼ to ½ inch thick) 1½x1½ (¼ to 7-16 inch thick).

WORLD'S PRODUCTION OF COAL IN 1901.

The forthcoming volume of Mineral Resources of the United State for the calendar year 1901, United States Geological Survey, estimates the world's production of coal in 1901 at 866,165,540 short tons. The three great coal-producing countries of the world are the United States, Great Britain and Germany. The output of these three countries combined makes up 81.61 percent of the world's total. Austria-Hungary comes fourth, France is fifth, Belgium sixth, and Russia seventh. The last country, notwithstanding its vast area, produces only about 6 percent as much coal as the United States. The three countries which lead in the production of coal are the three countries that lead in industrial development. Prior to 1899, Great Britain led among the world's coal producers but during 1899, 1900 and 1901 the United States has made such remarkable increases in coal production, due principally to the unprecedented activity in the iron and steel and in other metal trades, that we now stand far in the lead of all competitors, with a production in 1901 exceeding that of Great Britain by 47,965,938 short tons, or 19 percent. Up to the close of 1900 the coal production of Great Britain and her colonies, if taken together, still exceeded that of the United States, the excess in 1900 being 3,368,825 short tons; but the enormous output of the coal mines of this country last year exceeded by about 26,000,000 short tone the entire output of Great Britain and her dependencies, including India and the Transvaal.

Of the output of coal in 1901, the United States produced 33.86 percent, Great Britain and her dependencies 30.86 percent, and Germanv 19.42 percent, or, combined, 84.14 percent of the total production.

Newfoundland and Cuban Reciprocity.

(Special Correspondence.)

WASHINGTON, Oct. 21.—The interests of exporters of iron and steel products have received some advancement at Washington during the past few days. Announcement is made of the probable successful termination of the reciprocity treaty negotiations between the United States and Newfoundland which have been in progress for fully 12 years. Newfoundland will receive a favorable entry into the United States for certain of her fish products and one of the most important concessions which she will make in return will cover a wide range of machinery and upon these machinery items as well as upon certain manufactured products such favorable tariff rates will be granted as to insure an immediate increase of exports to Newfoundland.

Further progress in the matter of the Cuban treaty is waiting upon the initiative of the Cuban government. State Department advices show that European commercial interests are opposing in the strongest manner Cuba's negotiation of this treaty with the United States. This was to be expected for under the treaty submitted to President Palma by Secretary Hay practically the entire commerce of the island (amounting according to recent statistics to $66,000,000 of imports annually) will be diverted to this country, whereas should the treaty fail American manufacturers will be obliged to compete on the same footing as Great Britain and Germany. Despite the European opposition and the efforts of opponents in Havana the administration believes that the treaty will be accepted.

Price Policy of the United States Steel Corporation.

A representative of the United States Steel Corporation has been quoted as saying: "It has always been the policy of the combine since its organization to work in harmony with the independent companies. Our object has been to maintain prices at a reasonable level, and solicit the cooperation of the independents in this respect. A number of concerns, among them the largest in the country, are working with us, and I have every reason to believe will continue to do so. However, there are others that do not hesitate in putting down prices when the demand begins to show signs of falling off. While we have sold our products at lower prices than many of our competitors right along, we are forced to meet all reductions when quotations get below ours. There is absolutely no truth in the statement that we have been holding up prices in order to check competition. On the contrary, the United States Steel Corporation is selling a great deal of its material at prices ranging from $1 to $5 a ton below the quotations of certain independent companies."

PERSONAL.

Chas. G. Eckstein, the German representative of the Philadelphia Pneumatic Tool Co., arrived in New York Oct. 17, and will remain some weeks in this country.

James Manning, treasurer of the Syracuse Plow Co., of Syracuse, N. Y., has sailed for an extended sojourn abroad. He will make a trip to South Africa.

A. W. Maconochie, a millionaire manufacturer and member of parliament from Scotland, was a visitor to Detroit last week. He inspected the plant of the Boyer Machine Co., a branch of the Chicago Pneumatic Tool Co., with a view of duplicating that plant in Scotland for the Consolidated Pneumatic Tool Co., the English branch of the big Chicago concern. Mr. Maconochie is the head of the board of directors of the English branch of the company.

Superintendent Harry Menough, of the Mingo Junction, O., plant of the National Steel Co., has resigned to engage in the manufacture of steel castings at Wellsville, O.

John J. Lumm, heretofore purchasing agent of the Advance Thresher Co., of Battle Creek, Mich., has been made manager of the Battle Creek Iron Works Co., Ltd. This company manufactures the Burns drilling, reaming, milling and tapping machine.

National Founders' Association.

The annual convention of the National Founders' Association which has been held in New York for the past two years, is appointed for the Cadillac Hotel, Detroit, Wednesday and Thursday, Nov. 19 and 20. The association has made a marked gain in membership in the past year.

Catalogue "C" has been issued by the Green Engineering Co., of Chicago. The Green traveling link grates and settings are discussed at length with many illustrations and there are several pages of data in regard to the bituminous coal fields of the middle States.

A large steel casting recently turned out at the foundry of the Bethlehem Steel Co., South Bethlehem, Pa., weighed in the rough 330,000 pounds. It is intended for one-half of the top crosshead for a 12,000-ton prying press the company is building for the Carnegie Steel Co. The finished casting is 13 feet 2¼ inches high, 24 feet 4 inches long, and 5 feet 2 inches thick.

Bulletin No. 4 of the University of Texas Mineral Survey, prepared by B. F. Hill, assistant geologist, has just been issued by Dr. Wm. B. Phillips, of the University of Texas, director. It deals with the quicksilver deposits at and near Terlingna, Brewster county. Under Dr. Phillips's direction the publications on Texas mineral resources have been highly creditable.

The Cherry Valley Iron Co., Pittsburg, has closed negotiations for the purchase of the coal and coking properties of the Penn Coke Co., Greensburg, Pa. The company has considerable coal land and 100 coke ovens. It is reported that this is but the beginning of extensive coke operations on the part of this company.

Financial interests in Baltimore, including bank and trust company presidents and the heads of several manufacturing concerns, are said to be considering the organization of a large corporation for the manufacture of steel castings for railroad cars and other purposes. The proposed capitalization of the company will be $1,000,000 or over, and Baltimore interests are asked to furnish $500,000. Charles T. Crain, president of the Farmers' & Merchants' National Bank; Howard Carlton, president of the South Baltimore Car Works; H. Crawford Black and Thomas J. Hayward are reported as active in the new enterprise.

THE IRON INDUSTRY IN GERMANY FROM A TECHNICAL POINT OF VIEW.*

BY W. BRUGMANN, DORTMUND.

In the paper by Mr. Schlink, read in 1880, the author observes "that though the German works are endeavoring to adopt all modern improvements, there is nothing remarkable about their arrangements." Today Germany possesses a whole series of blast-furnace works which are in no respect inferior as regards their appliances to the works of other countries. The excellence of their equipments has called forth unstinted admiration on the part of many distinguished members of the Iron and Steel Institute (of Mr. E. Windsor Richards among others).

The appliances in Germany have been to a great extent based on those of American works, though this statement does not imply that they are mere copies. The construction in rapid succession of a number of new works in the minette district and on the Rhine, as well as the rebuilding of older plants, afforded the opportunity to profit progressively by the experience accumulated during the time of unprecedented increase in the production. The greater portion of all the installations were constructed in accordance with the designs or advice of the eminent engineer, Mr. F. W. Lürmann, the inventor of the slag tuyere. But before discussing the blast furnace plants in detail, the progress in the manufacture of coke calls for some attention.

The iron manufacturers require that the ash content of good coke should be as low as possible, and that the resistance to crumbling should be as high as possible. By the introduction of coal-washing plants, coke can be produced with a very low ash content. The loss of coal in the process of washing was, however, very considerable; and since the carrying capacity is a more important consideration than the ash content, the latter was allowed to remain at 8 to 9 percent.

To obtain a firmer coke, the coke makers add to the regular coking coal a proportion of splint coal. Special mixers are used, which permit of regulating exactly the amount added, and insure uniformity in the mixture. A greater degree of density is also imparted to the coke by the stamping of the coking coal. This is effected in boxes which are traversed in front of the ovens. This process is extensively used in Upper Silesia, but it appears likely to be adopted in Westphalia on a larger scale than formerly. The most important agent in the production of hard coke is a highly heated oven. In the Coppée oven, which is almost universally used in Germany, the hot working is attained by making the chambers narrow and not too high.

An improvement of considerable importance for ovens with by-product recovery plant was effected by the Otto method of bottom firing. These ovens have a coking time of 22 to 36 hours, according to the kind of coal used and the internal width of the ovens. By the heat of distillation of 1 pound of coal charged 1.2 pound of water are evaporated, a result which is rarely exceeded in ordinary ovens.

According to Dr. H. Wiechel, the production of coke in by-product ovens in Germany, for 1900, was 42 percent of the entire quantity manufactured. Substituting for the 6,300,000 tons of coke produced by this process the 8,400,000 tons of coal corresponding thereto, the by-products recovered annually amount to 294,000 tons of tar and 84,000 tons of sulphate of ammonia; which figures represent in the case of tar 3.5 percent, and for sulphate of ammonia 1 percent of the dry undistilled coal.

Of sulphate of ammonia, Germany imported 80,000 tons anually twenty years ago, while at the present time not more than 30,000 tons are imported.

The improvements in the mechanical appliances of German blast furnaces are best judged by the fact that the workmen employed in the blast furnace industry in 1880 numbered 22,000. At the present day some 35,000 are employed, notwithstanding the production is more than treble that of the previous period. The improvements in the appliances for transport of raw material and iron have chiefly contributed to this reduction in the proportion of manual labor.

Extensive shunting stations with central signal boxes, and weighbridges with hydraulic or electric counterbalancing arrangements, have been laid out. By means of these, the long trains of ore wagons can be conveyed in a minimum of time to the raised tracks laid over the ore-tipping ground. It is particularly essential that those works situated in the coal district which obtain their ore from abroad should possess facilities for stocking several cargoes within a few days. The necessary space for stocking large quantities in ore bins is generally provided beneath the tracks on to which the ore wagons are run. The wagons themselves for transporting the ore are self-discharging, being fitted with flap side doors. The Talbot wagon is arranged to discharge its load on either side of the track.

Unloading appliances of American type (Hunt and Brown) are employed to convey the ore from the holds of vessels to the furnace yard. The Krafftwerk at Kratzweick, near Stettin, the Vulkan, at Duisburg, the Krupp Works, at Rheinhausen, the Union Company, at Dortmund, all have installations of this kind.

Aerial wire ropeways exist in almost every ironworks. The firm of Pohlig and that of Bleichert have constructed a number of remarkable systems of ropeways. These are often employed to convey the ore or coke direct to the top of the furnaces, or for the removal of the crushed slag. At the Henrichshütte at Hattingen the whole of the raw material is carried to the blast furnace by means of these suspended tracks.

Where it is not the practice to grind the slag, it is got rid of by pouring it into tubs on tipping wagons of about 10 tons capacity; or it may be removed in ladle wagons similar to those for liquid metal. The wagons are very often of standard wheel gauge. A number of these have been built by the Junkerather Company.

Owing to the certainty with which the phosphorus, the heat-agent in the basic process, can be introduced into the pig iron, the practice of conveying the iron in the liquid state from the blast furnace to the steel works has been everywhere adopted where the local conditions were favorable. Mixers with tilting arrangements, which contain up to 250 tons of metal, are also installed at almost all these works. Among many other advantages attending the transport of liquid metal, not the least is the great economy in labor gained thereby. Under these altered conditions the term "pig iron," familiar also among German iron workers, certainly appears to lose its significance. Casting machines have not been adopted in Germany, for the reason that almost all the iron is sold according to analysis, or is at least carefully sorted.

In recent years the exterior of the blast furnace has undergone considerable modification. The heavy cast iron columns supporting the cast iron bearer plate are now seldom used, nor is the framework, consisting mainly of four corner columns carrying the top charging platform. In the newer installations eight columns are arranged round the furnace body, which stand upon the foundation below the free-standing hearth. These are carried up to the charging platform, and the wrought iron bearer plate is supported on brackets projecting from them, also the platform giving access to the tap-hole and the tuyeres. The casing of the hearth and boshes is constructed of strong riveted plates, though it often occurs that the boshes are constructed with cooling rings and wrought iron hoops. The furnace body is held together by strong hoops. The expansion of the furnace body is provided for by means of stuffing boxes beneath the charging platform. At some works the furnaces are built of bricks of small dimensions, laid with cement. Carbon bricks are also much used. Mr. Burgers, of Schalke, has constructed a furnace at the Vulcan Works, the body and bosh of which consist of cast iron, lined with firebrick. This furnace has been nearly three years in operation, and the working has

*Read at the Düsseldorf meeting of the Iron and Steel Institute, August, 1902.

been perfect, even though he has blown hot working iron alloys, such as ferro-silicon. A model of this furnace is shown in the Exhibition. At the Hoerde Works, Mr. von Vloten has placed at the tuyere level a ring formed of water-cooled bronze wind boxes, which rests on a heavy ring casting.

The dimensions of the newer blast furnaces in the coal district and the minette region vary in the following degree:

Height	22 m. to 25 m. (72 ft. to 82 ft.)
Diameter of throat	4 m. to 5 m. (13 ft. to 16½ ft.)
Diameter at the bosh	6 m. to 7 m. (19¼ ft. to 23 ft.)
Diameter of the hearth	3.5 m. to 4.5 m. (11½ ft. to 18 ft.)

Gas down-takes of every kind are in use in Germany. The Köln-Müsen furnaces work with open tops, and the gas is drawn off through a central tube and lateral apertures. In the minette district the Parry cone, and in the coal district the bell, are chiefly used. Latterly, double-sealed furnace-tops have been introduced. The Buderns Company employ a serviceable method of double-sealing by means of a system of bells. At Rombach and Hoesch automatic charging has been adopted, the method of closing the furnace top being adapted to the system of charging.

During the last few years considerable progress has been made in the purifying of blast furnace gas, necessitated by the introduction of gas-driven engines. Besides the well-known older appliances, the methods commonly used in gas works were followed, and centrifugal apparatus, particularly that of Theisen for blast furnace gas, and the Kôrting injector, have come into general use. It is now definitely proved that a complete purification of the gas and the elimination of moisture from it are perfectly possible; also that the quantity of water necessary for cleansing is not at all excessive.

For heating the blast, Cowper stoves are employed at the more modern works. These are usually 6 to 7 meters (19½ feet to 23 feet) in diameter, of 20 to 30 meters (65½ feet to 98½ feet) high. A modification by Lürmann consists of an enlarged crown (the space above the checker-work being increased), into which the cylindrical portion projects. The checker-work is supported on an iron grid, and also on stonework. Instead of the valves as constructed by Cowper, the revolving valves of Schmidt are sometimes used. For closing the cleansing openings, the Morton doors are much in favor.

The blast furnace industry has taken full advantage of the great progress in steam engine construction in Germany. It also became clear that the large surplus of gas obtained in the working of several furnaces might be usefully employed in generating electricty which could be distributed as power to any desired part. Not only the large works combined with dependent installations, but also smaller works began to put down central electric power stations; and the collective output of power, amounting to 1,200 horsepower, permitted the employment of compound engines.

This was followed by the construction of blowing engines on this principle, the horizontal type being in general preferred for the blast. The increased piston speed, as compared with the older steam engines, was productive of some difficulty with the direct-driven blowing engine, as it was found that the leather valves in common use could no longer be depended on. Added to this was the necessity to increase the blast pressure. By the introduction of lifting valves instead of flap valves this defect was obviated. Two systems of valves are chiefly used, namely, the Riedler-Stumpf and the Ganz-Hörbiger. These are on view at the exhibit of Oechelhäuser and Kleins.

The adoption of the compound steam engine necessitated the raising of the boiler pressure. At the present time, a pressure of 120 pounds to 150 pounds per square inch is usual. The Cornish boiler is most in favor, but the improved method of cleansing the gas now permits the use of more complicated types, among which are water-tube boilers with mechanical scrapers. Boilers with special firing arrangements are principally used.

In spite of the notable improvements effected in the steam engine in recent years, these will with difficulty hold their own against the engines driven by blast furnace gas. How rapidly the latter are coming into use is shown in a striking manner on comparing the Paris Exhibition with that of Düsseldorf. At Paris the 600-horsepower blowing engine of the Delamare-Debouteville type built at Seraing, attracted the attention of technical men of all nations as the largest and sole existing machine of the kind. The gas engines displayed at Düsseldorf are applied as universally as steam engines, and are scarcely inferior to these either in number or in size.

The pioneers among German blast works in the use of gas engines on a great scale were the Hoerde and Differdingen Works, though at the present time nearly all iron works are using this source of power in smaller capacities. Hoerde has three Oechelhäuser two-throw engines, each of 600 horsepower, and one Deutz four-throw engine of 1,000 horsepower, all of which are used for the generation of electricty; and at Differdingen there are nine Seraing machines, each of 600 horsepower, three of which supply the blast. Double-acting two-throw engines of the Kôrting system have also recently been put in operation at various works. It is claimed for engines driven by blast furnace gas that they are highly economical. It is true, when running at full load, that the gas consumption is low. But with lighter loads a corresponding diminution in the consumption of the gas does not occur, as is the case with steam engines.

The power absorbed in washing the gas is also not inconsiderable, and reduces the net available supply of power by an appreciable amount. With regard to the initial cost of installation as compared with a good steam power plant, the cost of a blast furnace gas engine with gas-washing apparatus is approximately the same as that of a steam engine with a battery of boilers. Neither the existing technical defects nor the question of cost will, however, prevent the adoption both of blast furnace gas engines and of ordinary gas engines, as is evident from the rapidly extending use of these. It may rather be assumed that the employment of such machines is still only in the initial stage. At a number of works the surplus power is applied to the manufacture of cement from blast furnace slag. It is, in fact, usual everywhere to crush this latter and sell it as slag sand, or to make building bricks from it.

As regards the daily output of the German blast furnaces, this amounts to about 200 tons per furnace per day. In the minette district it averages somewhat less and in the coal district a little more. Much higher productions are achieved in individual cases. An inquiry addressed to the Deutscher Kaiser Company elicited the reply that in 1902 the daily output of one furnace had been 518 tons, while the combined output of four other furnaces was 1661 tons, or 415 tons per furnace. The extraction from the ore mixed with flux charged was 42 percent.

The employment of labor at the blast furnaces varies exceedingly, so that comparative data are scarcely obtainable. To add to the difficulty, the particulars submitted by the works frequently include the industries connected with iron making, such as coke making, brick factories, etc. Again, those works which manufacture every kind of iron naturally have to stock ore of all kinds on a large scale, which increases the cost of transport of raw material. Finally, those blast works which treat the pig iron in the liquid state can economize considerably in labor.

Still, the figures for some of the works may be of interest:

January 1 to June 30, 1902.	Production, tons.	Number of workmen.	Output per man per year. tons.
Deutscher Kaiser Company	208,651	980	419
Hörder Verein	255,720	685	373

The following data were also given by the kindness of the Hörder Verein:

BLAST FURNACE WORKS AT HOERDE.

Year.	Production of iron, tons.	No. of workmen employed at the blast furnaces.
1880-81	77,276	602
1881-82	82,204	595
1882-83	90,481	583
1883-84	94,078	659
1884-85	99,443	558
1885-86	106,468	549
1886-87	91,356	574
1887-88	131,633	513
1888-89	121,898	470
1889-90	134,785	478
1890-91	122,618	474
1891-92	147,500	497
1892-93	146,570	491
1893-94	178,762	517
1894-95	181,241	565
1895-96	215,855	583
1896-97	218,640	581
1897-98	239,990	694
1898-99	250,956	645
1899-1900	274,099	772
1900-01	279,444	800
1901-02	255,720	685

The maximum output of any one blast furnace at Hoerde was 321 tons.

THE MESABI IRON-BEARING DISTRICT.

Monagraph 43 of the United States Geological Survey, now in press, by C. K. Leith, is a geological discussion of the Mesabi iron-bearing district of Minnesota. In his letter of transmittal, Mr. C. R. Van Hise says the geological succession in the district, the unusual size, shape and structure of the ore bodies, their manner of development, and the peculiar and rapid methods of exploitation of the ore, all present features of unusual scientific and economic interest. This monograph is one of a series planned to treat the iron-bearing districts of the Lake Superior region. Monographs on the Penokee-Gogebic, the Marquette, and the Crystal Falls districts have been published in the order named. The one on the Mesabi is fourth. The Mesabi iron district is described as extending from Grand Rapids on the Mississippi River northeastwardly to Birch Lake, a distance of about 85 miles, with a width varying from 2 to 10 miles. Its area is about 400 square miles. The main topographic feature of the district is a ridge known as the Mesabi, or Giant's Range, Mesabi being the Chippewa-Indian name for giant. The Mesabi Range, for the most part, forms a divide whose drainage is apportioned among three of the great river systems of the country, the Mississippi, the St. Lawrence, and the Nelson. Three railways, all with terminals on Lake Superior, touch the range—the Duluth & Iron Range Railway, the Duluth, Mesabi & Northern Railway, and the Eastern Railway of Minnesota (the Great Northern).

The development of the district has been marvelous. In November, 1890, iron ore was found just north of what is now known as the Mountain Iron Mines; in 1892, 4,245 long tons of iron ore were shipped; in 1901, 9,004,890 tons were shipped, and the total shipments of ore during the ten years have been 40,404,967 long tons.

The literature of the region from 1832 to 1902, inclusive, is briefly noted, and the geology of the district is elaborately discussed. The iron ore deposits of the Mesabi district are confined to the part of the Biwabik iron-bearing formation lying in the central and western portions of the district, and of the area of the iron formation in this portion of the district they occupy about 4 percent. They lie near the surface and seldom reach a depth greater than 300 feet. Commonly the depth is less than 150 feet. They lie in shallow, irregular basins. The widths of the deposit seldom exceed a quarter of a mile, and the lengths are not uncommonly half a mile or more. The ores are, for the most part, slightly hydrated hematites. Only two deposits on the range are known to contain sulphur in injurious amounts. The Mesabi ores range in texture from large crystalline masses requiring the use of a crusher, as at Biwabik, to fine, soft dirt which runs like sand between the fingers. The looseness of the ore as it lies in the deposit is shown by the fact that in computing the tonnage of Mesabi ores, from 11½ to 18 cubic feet are allowed per long ton, whereas in the hard ore deposits of other ranges the common figures are 8 to 9 cubic feet per long ton. Because of the bedded and jointed structure of the ore deposits, water is able to pass through them freely. The ore deposits are at present in part above water level and in part below it. A good instance of this appears at Virginia, where the Columbia mine on low ground receives a vast quantity of water, while the mines on the higher ground adjacent are comparatively dry. The report discusses at some length the deposition of the iron ores in the Mesabi district.

Because of the soft character of the Mesabi ores and of their occurrence in shallow deposits, much ore is loaded directly by steam shovels on railway cars in open cuts. The Mesabi iron ores are transported to Lake Superior by rail, and thence by the lakes to terminal lake ports. In density of traffic and in freight earnings per mile of track, there are but half a dozen roads in the United States which compare with the three railroads carrying the ore from the Mesabi mines to Lake Superior, a fact brought out in the famous "ore-rate" case, in which the State of Minnesota made an unsuccessful attempt to have the rate on freight reduced. The rate from the Mesabi range to Lake Superior is uniformly 80 cents per ton.

In 1891 the district had not been opened up. In 1895 the Mesabi district became the largest producer in the Lake Superior region, passing in that year the Marquette district, which since 1854 had held first place. In 1901 the total production of the Mesabi district was 44 percent of that of the Lake Superior region, and two and one-half times as much as its nearest competitor, the Menominee, which, in 1901, for the first time surpassed the Marquette district in production. Largely on account of the Mesabi production, the State of Minnesota in 1901 passed the State of Michigan as the largest iron producer in the United States. In total shipments the Mesabi district still behind the Marquette district. At the close of 1901 the Mesabi district had shipped a total of 40,404,967 long tons, and the Marquette district, open since 1854, had shipped 62,847,473 tons. At the present rate of production the Mesabi total will pass that of the Marquette district in about four years.

The total amount of high grade ore—that is, containing above perhaps 58 or 59 percent of metallic iron—at present in sight on the Mesabi Range has been estimated at 400,000,000 to 600,000,000 tons. The commonly accepted figure is 500,000,000 tons. Of this 20 or 25 percent is Bessemer ore. The aggregate amount of high grade ore in sight up to 1902 on all the "old ranges" of the Lake Superior region has been thought not greatly to exceed 250,000,000 tons. Even if the estimates for the Mesabi Range and the old ranges are considerably away from the truth, it is apparent that the Mesabi holds a commanding position in the region in its reserve tonnage. In 1901 the United States Steel Corporation sold [or used] about 72 percent of the total Mesabi production. It would appear that the Eastern Railway of Minnesota (Great Northern) stands well up among the leading iron ore interests, and if the iron ore deposits not yet opened for mining were taken into account, the Eastern Railway would probably stand second only to the United States Steel Corporation.

When Mesabi iron ores first came on the market it was not found practicable to use more than 33 percent of them in furnace charges for the reason that, because of their soft character, they packed in the furnace. Since that time the percentage used in the furnaces has steadily increased, until at the present time the average furnace mixture contains 45 percent of Mesabi iron ore and 55 percent of the old range ores. Certain of the coarser Mesabi ores can be used to make up 75 to 85 percent of the furnace charge.

The Pennsylvania Railroad has placed another order with the Baldwin Locomotive Works for 150 engines, making in all 350. This is the largest order the company has ever given for locomotives. They are to be delivered early next year. Besides the locomotives that will be constructed by the Baldwin Locomotive Works the company will also build between 175 and 200. It is the intention to work its locomotive shops day and night. At the present time the shops at Altoona are turning out 13 locomotives a month, but with the introduction of some new machinery it is believed the output can be increased. It is reported also that the Pennsylvania will place additional orders for 5,000 freight cars.

The St. Louis Car & Truck Co. is the name under which the J. G. Brill Co., Philadelphia, will operate the plant recently purchased in St. Louis.

THE EMMERT UNIVERSAL VISE.

The Emmert Mfg. Co., of Waynesboro, Pa., has recently designed and placed upon the market a very ingenious vise which is illustrated herewith. It has been devised specially to supply the needs of toolmakers and of other metal workers requiring a vise capable of holding work in almost every conceivable position. It can be rotated on the bench, raised and lowered, placed in a horizontal position or at any angle. As

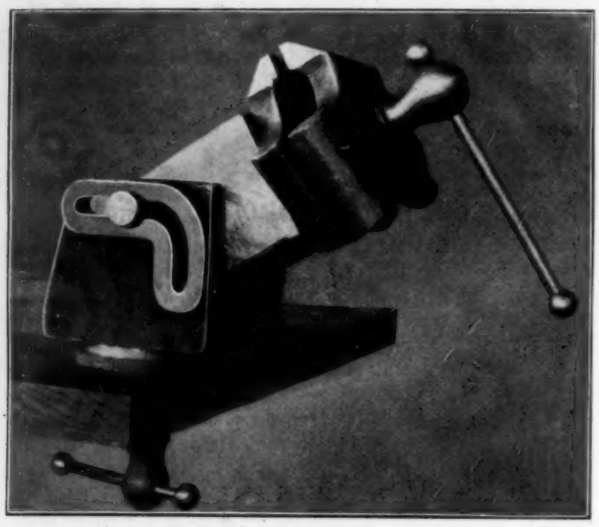


FIG. 1.—THE EMMERT UNIVERSAL VISE.

seen in Fig. 1 there are three jaws, one rough for all ordinary cast iron work, one smooth for brass or finished work and there is also a taper jaw which can be used for all classes of irregular work. The vise is equipped with a pair of pipe jaws. The dimensions of the jaws are 4 inches and the vise will open 5 inches.

The construction of the vise, the index stop for maintaining the different jaws in any desired position, the clamping bolt to lock the vise firmly at various angles are shown clearly in the two illustrations, and in connection with Fig. 2 it may be pointed out that there is a set of jaws made separate to fit on the round projecting jaws seen in the cut. These consist of a set of jaws to hold any class of taper work, a set of jaws to hold copper work and one set of jaws to hold any size of ring. An additional jaw may be placed on the round projection extending from the top of the vise, and thereby increase the capacity of the opening ten inches. The vise is made entirely of cast iron and cast steel and has been built of ample strength to stand the grade of hard usage brought to bear on this class of tool, and in the course of recent shop tests has been highly successful.

J. N. Tata, of Bombay, who arrived recently in the United States to arrange for placing contracts for various machinery with American concerns, is now making a short tour of the United States accompanied by A. T. Cockrane, manager of the New York offices—Tontine Bldg., 82-88 Wall St.—of Tata & Co. They will visit Atlanta, Chicago, Duluth, Buffalo, Pittsburg and Schenectady and expect to return to New York about November 1.

A new catalogue of the Jeffrey Mfg. Co., Columbus, O., known as No. 72, is ready for mailing. It describes, with full illustration, the company's complete line of elevating, conveying and power transmission machinery.

At the annual convention of the National Association of Agricultural Implement and Vehicle Manufacturers at Minneapolis last week, the following officers were elected: President, Martin Kingman, of Peoria, Ill.; first vice president, O. W. Johnson, Racine, Wis.; chairman of executive committee, F. E. Myers, of Ashland, O., and Robert Foos, of Springfield, Ohio, treasurer. The next convention will be held in Cleveland.

UNITED STATES SHIPBUILDING CO.'S PLANS.

Henry T. Scott, of San Francisco, chairman of the executive board of the United States Shipbuilding Co., who was in Bath, Maine, last week inspecting the plants absorbed by his corporation, the Hyde Windlass Co. and the Bath Iron Works, gave assurance that both these industries would be enlarged. The capacity of the windlass works will be increased to meet a growing demand for the product, while at the iron works a large pier will be built for docking and repairing purposes, and the yards and shops rearranged to accommodate new machinery and an increased force. Mr. Scott predicts that within a short time the Bath Iron Works will give employment to 3,000 men. He said: "The economies of the United States Shipbuilding Co. are to be effected by the assignment of special classes of work to the different yards, and not by the centralization of work in any one or two places. The outlook for the combination is very bright. A large amount of tonnage is to be built in this country in the immediate future, and, although the passage of the subsidy bill would be a great help to the shipbuilders, the construction of a great many ships for the American merchant marine does not depend upon the passage of the bill. One company on the Pacific Coast is planning to build more vessels than all the Pacific yards can handle. I expect that the economies to be practiced by the United States Shipbuilding Co. will enable it to get some foreign contracts. At any rate, the American merchant marine is bound to grow, especially on the Pacific, and there will be busy times in Bath."

Republic Iron & Steel Co.'s Meeting.

At the stockholders' meeting of the Republic Iron & Steel Co., held in Jersey City last week, the following directors were elected: For the term ending 1905—August Belmont, Grant B. Schley, Geo. R. Sheldon, Wm. H. Hassinger, John Crerar. For term expiring 1904—L. C. Hanna, Geo. A. Baird. For term expiring 1903—Chas. H. Wacker. The only new member of the board is Mr. Wacker, a well known Chicago brewer and a director in the Corn Exchange Bank, who succeeded W. E. Taylor, resigned. The executive board consists of G. Watson French, chairman; A. W. Thompson, George A. Baird, H. Rubens, J. F. Taylor and A. W. Houston. The officers elected for the coming year are the same as for the past year, as follows: President, A. W. Thompson; vice president and treasurer, J. F. Taylor; secretary, Y. B. Haagsma; chairman of the executive board, G. W. French. It is

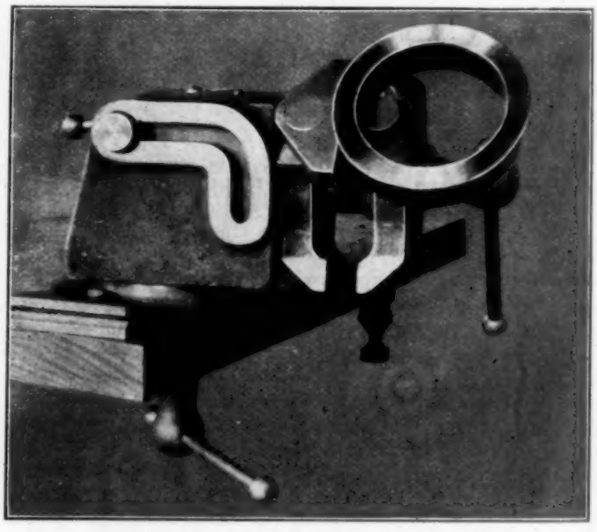


FIG. 2.—THE EMMERT UNIVERSAL VISE.

announced that the next statement of the company, to be issued in February, will cover the six months ending Dec. 31.

The Southern Stove Manufacturers' Association met in Chattanooga, Tenn., Oct. 16, and advanced the price of stoves 10 percent. This has been made necessary on account of the increase of the cost of the essentials of stove manufacture.

MARKETING THE AMERICAN SURPLUS OF STEEL.

Axel Sahlin, who has managed blast furnaces in the United States and England, and who is now of the firm of Julian Kennedy & Sahlin, consulting engineers, of London, writes an important part of the British Commission's report on the American iron industry. We quote the following:

"In an interview, Charles M. Schwab made the statement that his policy would be to keep the plants of the United States Steel Corporation going at their full output, which, at their present rate of production, represents about 9,000,000 tons of steel per year. 'We will sell all we can at home,' he said; 'what we cannot sell at home we will find a market for abroad, and we will rather sell at a slight loss than curtail our production.' The wisdom of this policy from an American point of view cannot be doubted. The men who wield the destiny of two-thirds of the most important industry in the largest industrial country in the world have in their hands an incalculable power for good or evil. A sudden move on their part toward curtailing production would at once throw the iron business and all kindred industries into a panic. The United States Steel Corporation support, in supplying the wants of their works, hundreds of other plants,—engine and boiler manufacturers, makers of paints, oils and other lubricants, pipe fittings, tools, brass goods, lumber, brick, cement, stationery, chemicals, instruments, and what not. As long as the works of the corporation keep going apace, taking their usual supplies, all these industries and their hundreds of thousands of employes will be kept in activity. A sudden retrenchment or partial stoppage on the part of the giant corporation would immediately throw them all into partial idleness and create widespread financial distrust and distress. While unchecked and unlimited competition in the iron industry was the order of the day in America, such sudden stoppages did come periodically and with scant warning, causing great and unexpected fluctuations in prices and changes in economic conditions. It is to be hoped, and many believe, that the Steel Corporation will make the world their debtor by using their great influence in their own interests as in that of others, to prevent and minimize these sudden fluctuations.

"From our point of view in England, on the other hand, this policy certainly carries with it great menace. The Steel Corporation control a practically unlimited capital and the best mines, the best coke, the best plants, the best lines of communication, the ablest managers, and the most perfect selling arrangements. When this great syndicate deliberately decide to sell a certain small percentage of their enormous output at cost, or even at a loss, in our own territory, such an action will be apt to demoralize our prices and to send us through such a period of reorganization, failures and destruction of capital as America experienced in the long to be remembered years between 1893 and 1897. But as America during these years, after learning the dearly bought lesson, pulled itself together and created the present successful organization of its iron and steel business, so, I have no doubt, will Great Britain do. * * *

"There is no point in the world that need teach Middlesborough a lesson in the cheap production of iron and steel. The Durham coke, if properly made, is equally good, if not better, than that of Connellsville. The collieries and coke ovens are nearer to the Tees than is Connellsville to Pittsburg. The Cleveland hills yet contain a goodly store of iron ore, if also the grade is going down. To enrich the mixtures, the Scandinavian mines, considerably nearer to Middlesborough than are the Lake Superior fields to Pittsburg, supply an even richer and better raw material. In the opposite direction Spanish hematites are available with easier transport than that of the Lake ores. Middlesborough has also the advantage over Pittsburg of being located on the sea and in the midst of the densely populated European countries. If, therefore, the Middlesborough ironmasters adapt,—not copy—American methods, not only as regards furnace plants and steel works, but also, and of still more importance, as regards generous employment of money, consolidation of interests, control of raw materials, selection of managers, and treatment and control of labor, they should never need fear competition from an industrial center situated 3,500 miles away from the markets at their very door, and this opinion, I take it, will also hold good for South Wales, the Midland districts and Scotland.

"Nor does the world stand still while the iron industry is growing and developing. New markets, new employments, new needs arise and multiply, and, therefore, it is, in my opinion, certain that there will be room for us all in the future, as in the past, though the preponderating influence in the iron world, and the largest outputs of iron and steel, counting by nations, will during this and the next generation continue to be found on the western side of the Atlantic Ocean.

"It is an axiom that no nation can remain or become a world power without the aid of an adequate iron industry. Great Britain cannot, and, I am sure, will not see its iron industry permanently lose ground. If, therefore, which I do not believe, it should come to pass that protected America to such an extent makes free-trade Britain the market for such a surplus of iron and steel products as cannot elsewhere be disposed of that the home industry of the latter country seriously and permanently suffers thereby, it must be remembered that nothing but the will and dictum of the British people keeps the door open for such imports, and that it is practicable, if not to close the door, at least to place such a barrier across it as to give those inside a change to live."

Bids Asked on Machinery and Supplies.

(Special Correspondence.)

WASHINGTON, Oct. 21.—The Bureau of Supplies and Accounts of the Navy Department has invited proposals for machinery for use at the naval station at Key West, Florida. Bids will be opened at Washington on Tuesday, Oct. 28. Among the items is a 25-h. p. 10x10-inch vertical center-crank engine. A second item is one 30-h. p. vertical tubular boiler, having about 394 square feet of heating surface. For the machinery plant at Key West there is also desired a 24-inch planer and a 2½-foot radial drill. The planer must have a capacity to plane 24 inches wide by 24 inches high by 6 feet long and the table to be driven by cut gearing to have a return speed of not less than 80 feet a minute. The combination radial drill is required to drill to the center of at least 60 inches and to have a rectangular table at least 16x24 inches.

On November 11 bids will be opened for supplying a considerable quantity of material for use at the navy yard at Mare Island, Cal. Among the items are considerable quantities of rivets, nuts and bolts; one crank shaft to weigh 2,082 pounds; two corrugated furnaces of an estimated weight of 5,600 pounds; propeller shafting of an estimated weight of 4,176 pounds; about 200 seamless drawn steel boiler tubes, and small quantities of steel plates and steel bars.

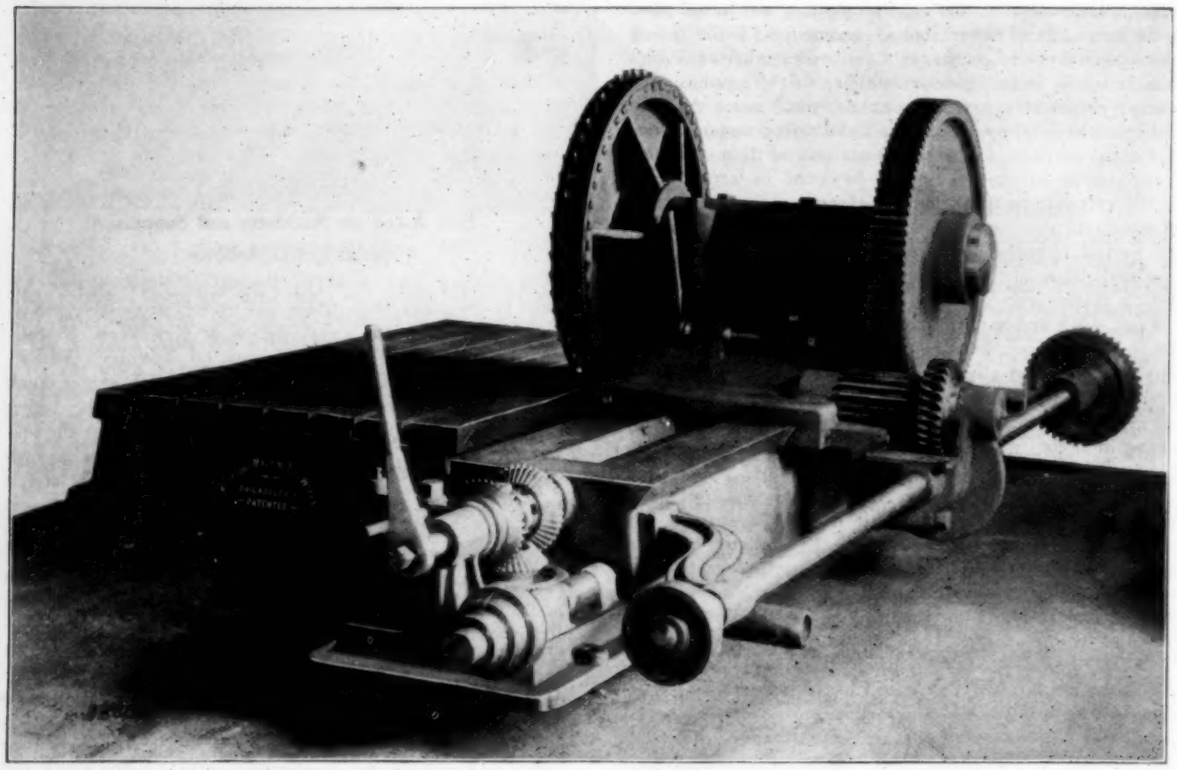
The committee appointed last spring with authority to sell the property of the Pennsylvania Furnace Co., consisting of two furnaces at Sheridan, Lebanon county, Pa., reported to the annual meeting that it had arranged a sale to Edward H. Garcin, of Trenton, N. J., and associates for $270,100 cash. The terms of the sale also provide for the surrender of 4,000 shares of the company's stock held by General E. Burd Grubb, with all his interest in the company, this being about equivalent in effect, it was stated, to a cash call for $300,000. It was stated that a bill of sale had been deposited with Joseph O'Neill, of the Federal Trust Co., of Boston, until the formal transfer of the property has actually been made. The annual election resulted in 18,962 votes being cast for T. E. Hopkins, D. M. Anthony, John Reed, J. A. Coram, W. M. Deen, E. C. Hopkins and H. W. Wesson, 800 shares of stock held by the Second National Bank of Reading, being present, but not voting. The treasurer's report stated that there had been a pig iron output in the year of 76,263 tons. The selling price was $14.87 and the cost of manufacturing $14.09, the profit being 78 cents per ton, amounting to $57,486. The net profits were reported as $3,877.

KEYSTONE ROTARY PLANER.

A new rotary planer is being placed upon the market by the Keystone Machine Tool Works, of Philadelphia, and two of this particular design have recently been shipped to the West Virginia Bridge & Construction Co., of Wheeling, W. Va. The machine, as will be seen by the accompanying illustration, is particularly useful in a plant handling structural material and may be employed in facing off large castings, ends of I beams, channel irons, etc., but the scope of the tool is by no means limited to this class of work and there are many jobs of heavy surfacing that may be worked to good advantage on a machine of this kind.

The rugged character of the tool is evident from the illustration but its capacity will be more clearly understood from a statement of the principal dimensions. The diameter of the cutter head over the cutters is 37 inches and the standard length of the tool is capable of milling is but 72 inches. The table has a length of 84 inches, is 48 inches wide and is 12 inches high, the minimum height of the table will be of interest in connection with the other dimensions and its greater convenience in handling heavy work recognized at once.

There are five changes of speed as well as a choice of feeds, etc., to suit the different widths and depths of cut as well as the material in hand. Provision is also made for feeding the cutter head to and from the work and the driving pinion is wide enough to permit of some latitude in this respect.



A NEW ROTARY PLANER.

A few new men have been added to the employes in the foundry of the A. Carpenter & Sons' Co., Providence, R. I., where the molders struck several weeks ago for the discharge of non-union molders. It is claimed by the firm that none of the molders have left since the beginning of the strike. The strike is still on at the Carpenter foundry, and at the foundries of the Miller Iron Co., and the Franklin Machine Co., with little change, it is stated.

The virtues of the Shelby arc and the Shelby incandescent lamps are expounded in two circulars of the Shelby Electric Co., of Shelby, O. Point is given to the arguments of the text by some shrewd illustrations depicting the variation in illuminating power of different lamps.

CANADIAN PACIFIC'S NEW SHOPS.

The Canadian Pacific R. R. Co. will concentrate at the new shops being built at Montreal, a large part of the repairing of engines and passenger coaches, at the same time making large provisions for the manufacture of locomotives and passenger as well as freight cars. The total floor space planned for immediate construction is about 750,000 square feet or over 17 acres. The buildings will be of pressed brick on rubble stone and concrete foundations. The hot blast system of heating will be used throughout. The passenger car shops, when completed, will be able to turn out 100 new cars per year, and repair 900 old ones. The freight car shop will have a capacity of 25 to 30 new cars per day and will be able to repair 100 cars per day. The locomotive erecting and machine shops and the boiler shop will have a capacity of 75 new engines per annum and in addition will be able to repair 400 during the same period. The wheel foundry is designed to turn out 250 wheels per day. Electric transmission of power will be used throughout with individual machine and group motors in the several shops. The sizes of the buildings are as follows: Freight car shop, 540x107 feet; planing mill shop, 500x127 feet; machine and locomotive erecting shop, 900x160 feet; holstering shop (two stories), 290x62 feet; passenger car paint shop, 672x100 feet; passenger car erecting shop, 672x100 feet; truck shop, 432x82 feet; car machine shop, 288x310 feet; blacksmiths' shop, 610x130 feet; gray iron foundry, 380x125 feet; machine and locomotive erecting shop, 90x160 feet; boiler shop, 300x120 feet; wheel foundry, 170x110 feet; frog shop, 250x100 feet; drying kiln, 250x100 feet; power house, 100x120 feet; office, 110x60 feet. The grounds are about 350 acres in extent.

According to reports the American Bridge Co. has closed contracts for the latter half of next year, and is entirely unable to take any for completion short of the second quarter of the coming year. What is true of this concern, it is stated by persons in the trade, is also true of the Columbia Bridge Co., Ft. Pitt Bridge Co., Riter-Conley Mfg. Co., and the McClintic-Marshall Construction Co. It is reported that premiums of 10 to 25 percent are being paid for steel for bridge and building purposes for immediate use.

ELECTRIC SMELTING AND MAGNETIC CONCENTRATION.

At the meeting of the American Electrochemical Society, held at Niagara Falls, N. Y., Sept. 15-18, a paper was read by M. Ruthenberg, of Philadelphia, on "Developments in Electrometallurgy of Iron and Steel." He referred mainly to recent developments in magnetic concentration, and incidentally touched on the possibilities of electric smelting. He spoke quite hopefully of the latter, describing a method of his own which yielded more complete results by simpler means than are contemplated in the application of electricity to this work on accepted lines. The concentration of magnetic ores was alluded to as one of the uses of electricity in connection with blast furnace work. The mineral pyrrhotite, a sulphide of iron, is also subject to magnetic attraction, but less so than magnetic. By careful adjustment of the strength of the electromagnet this mineral may be separated from the magnetite. One of the principal drawbacks to magnetic concentration of iron ores is the fact that the resulting material is in the form of a very fine powder, which cannot in that form be reduced in the blast furnace. To change this powder into a form suitable for use in the blast furnace, it is usual to make it into briquettes. Various binders are employed to give the briquettes the necessary consistency; lime, coal-tar, clay, etc., have been suggested, but none is satisfactory. The author now suggests another method of producing a suitable ore from the fine concentrate. He would pass the powder through an electric arc in such a fashion as to partly bake or fuse the particles together into coherent, solid lumps; these latter are in proper form for smelting in the blast furnace. By modifying this method a little, adding a reducing material to the concentrate powder in proper proportion, a direct reduction, either partial or complete, may be produced. A very pure iron would thus be made, since the usual sources of sulphur, phosphorus and other impurities are absent. The product of the reduction could be melted in the open-hearth furnace and blown to steel, giving a pure material suitable for the finest uses. The author referred to ferruginous beach sands, found in many places, as a source of iron ore which could be economically worked by the process he described.

Some interesting comments were made in the discussion of this paper, which is reported as follows by the *Engineering News:* Prof. W. H. Hart mentioned an interesting new electric concentrating process which he had seen in operation in a small way during the past summer in Denver, Colo. This process, after patents by Prof. L. I. Blake, of the University of Kansas, was electric rather than magnetic; it consisted in charging the finely powdered ore by means of a Holtz machine and thus separating the ore by repulsion. Prof. Hart thought that the author was entirely too sanguine in regard to the possibilities of electric iron smelting. He himself thought the blast furnace one of the most economical metallurgical processes in existence. Mr. N. S. Keith suggested roasting the ore to convert pyrrhotite to magnetite before the magnetic separation. He remarked upon the multiplication of processes preliminary to reduction which is involved in the methods described by the author, a multiplication which would in most cases be absolutely prohibited by the expense involved. He referred to Mr. T. A. Edison's electro-magnetic concentration process, which experience showed could not be economically worked. Mr. C. J. Reed, in this connection, referred to the many special conditions encountered by Edison which increased the difficulties and the cost of his work, and claimed that because of these the process could not be condemned because of Edison's failure with it. Mr. P. G. Salom expressed his belief in a future for electric smelting of iron, but thought that at present, on account of the great quantities of high-grade ore existing there was no economy in concentrating low-grade ores. Prof. J. W. Richards gave the result of a rough calculation he had made from the data of the author's paper; the figure given in the paper for power consumption in electrically fritting the magnetite into lumps, as proposed by the author, was a low estimate of power required, since, according to the speaker's calculation, it would involve an efficiency of 83 percent in the process. Still, taking his estimate for power, and assuming the cost of electric power to be $20 per HP.-year, as at Niagara, the cost of this fritting process alone would be $2.67 per ton of ore treated. This figure speaks strongly enough for the commercial impracticability of the process at present.

RECENT PROGRESS IN BRIQUETTING IRON ORES.

The chief feature of the meeting of the Engineer's Society of Western Pennsylvania, held at Pittsburg on Tuesday evening, Oct. 21, was an address by Henry S. Mould, of Pittsburg, on "Briquetting—Its History, Value and Possibilities in the Iron Industry. A quite full report of Mr. Mould's remarks is given below:

Whenever blast furnace managers are asked about briquetting, there is a tendency to smile and edge away. It is the old story of aversion to any redical change from establish customs until some one else has proved up the proposition. But if you bring up the subject of the loss resulting from flue dust waste and the evils resulting from the use of large quantities of fine ore in the furnace, there will not be found such a willingness to smile. If the furnace manager is honest, he will acknowledge that the scarcity of lump ore and its value in comparison with Mesabi, and the consequent necessity of using the fine material in the furnace in large quantities, increases the flue dust loss and gives rise to other dangers and evils that entail oftentimes heavy property loss and even the loss of human life.

It is to do away with these evils as far as possible that the subject of briquetting has been investiagted by myself for the last eight years. There have been many failures, with sometimes little prospect of ultimate success. As time has slipped away, the field where briquetting, if done successfully, would prove an important economic factor has opened out to vastly larger dimensions than it had eight years ago. Already the great precious metal ore smelters of the country are using briquetting machines to force their flue dust and fine ore into blocks. But the iron men have been more skeptical. The opportunities for demonstrating that the work can be successfully done in this field have been more difficult to obtain. But the time has come at last when a practical demonstration is about to be made, and I am confident that the test will prove that the years of experiment were not wasted.

And here it might be well to give something of the history of briquetting. In the fuel industry it can be traced back to 1594, when Sir Hugh Pratt wrote a pamphlet on the subject. Between that time and 1842, there were several spasmodic attempts at successful operation of briquetting machinery, but it was not until the latter year that the industry received its first exploitation. At that time the manufacture of fuel briquettes on a commercial basis was begun at Berard, near St. Etienne, France. From there the industry was introduced into other continental countries and into Great Britain. While the manufacture of fuel has been carried on since that time, notably in Germany, France and Belgium, many difficulties have been encountered. Although, through constant watchfulness and experiment, some of these difficulties have been partially eliminated, the process is not wholly successful, and the manufacturers are looking to this country for help.

In the United States, patents on briquetting machinery were issued as early as 1837, and since that date more than 100 patents have been issued. The first attempt to install a briquetting plant in this country was made at Port Richmond, Pa., in 1868. Eight years later, the Delaware & Hudson Canal Co. attempted to manufacture anthracite culm briquettes at Rondout, N. Y. The plant was soon sold to the Anthracite Fuel Co., but was discontinued in a short time, as the plant at Port Richmond had been. After that time, attempts were made to install plants at Mauch Chunk, Pa.; Mahanoy City, Pa.; Reading, Pa.; Gayton, Va.; Milwaukee, Wis.; Huntingdon, Ark.; Portsmouth, R. I.; and Chicago, but all of them were unsuccessful. The reasons for their non-success are that they did not have proper machinery; that the cost of their binder was too high; and that the operators were generally lacking in a thorough understanding of the subject.

In endeavoring to understand briquetting, and before I speak of my own efforts, it must be known that the conditions vary widely in different regions and with the materials that are to be put into block form. The bonding agent that can be successfully used with precious metal concentrates or flue dust from the smelters cannot be successfully used with anthracite culm, and the binder used in briquetting the latter cannot be used in briquetting iron flue dust or fine ores. Adjustability of pressure is also essential, as different materials

require varying pressure, ranging from 2,000 to 18,000 pounds to the square inch. From this you will see that the necessity for careful and patient experiment has been almost unlimited.

My entrance into the field of briquetting was made in 1894 in the interest of a bog ore manganese deposit. I made some experiments in this direction, and then my attention was attracted to the much larger field offered by iron flue dust, believing that if manganese ores could be briquetted, the flue dust could be handled in the same way. I talked the matter over with the late H. M. Curry, of the Carnegie Steel Co., who said that if such a process could be shown, that company would take it up:—first, with a view of briquetting their flue dust, and later all or a large percentage or their fine ores.

After a year of experiment, in 1895 I invited some officials of the Illinois Steel Co. and the Carnegie Steel Co. to witness some tests of iron flue dust briquetting at a plant at which I had installed some machinery in the city of Chicago. This demonstration was made in the presence of James Scott, of the Carnegie Steel Co., and C. H. Foote and C. L. Miller, of the Illinois Steel Co. The results of the test were such that an arrangement was made with the Illinois Steel Co. whereby I was to briquette for them 1500 tons of flue dust in order that a fair blast furnace test might be obtained.

At that time the most available machine for our purpose was what is known as an "eggette" machine, which is composed of two large rolls, each having an indentation in its face to correspond with a half of an egg shape, being so placed as to register accurately and so designed as to allow the eggette thus formed to drop on to a conveyor or belt. The briquettes made with this machine for the Illinois Steel Co. appeared to be satisfactory, and they were used in he Union furnaces. While the briquettes manufactured were strong enough to stand up in the furnace, there were a number of other difficulties that made further experiment necessary before a successful process could be evolved. In the first place, using the "eggette" type of press, so large a percentage of binder was necessary that the cost was too high. In addition to this, the machine as then constructed would not stand the wear essential in that class of work—in other words, the repair cost was too great.

The "eggette" press was scrapped and the Illinois Steel Co. purchased a second-hand brick press and started a line of experiments to see what could be accomplished toward making flue dust briquettes, with lime as a binder. About this time I came in contact with B. C. White, M. E., and told him of the great need of a press to do this work. He had already invented several machines and done some work in lines allied to my own. The result was that he brought out what is known as the White mineral press. This machine was of the disc type, the briquettes being formed in 48 molds, all in one piece known as the disc. The inventor expected that the fine ore would we properly mixed by the chasing or pugging rolls, but we soon found that proper preparation would have much to do with successful briquetting, and auxiliary apparatus was designed.

The first press of this type was erected at the works of the Carrie Furnace Co., at Rankin, in 1898, and was run until the plant passed into the control of the Carnegie Steel Co. Here again the repair cost was prohibitive. Moreover, the process was not wholly successful because, for one reason, at that time there was no drying machinery and the briquettes were not sufficiently hardened to stand the pressure in the furnace. About the time that the experiment at the Carrie furnace was made, the Illinois Steel Co. put in a White mineral press, and erected a dryer in connection with it. This press is still operating, but the operation is rather a makeshift than a successful solution of the problem.

From 1897 up to the present time, there was apparently no advancement in flue dust operation, although experiments were kept up continuously. The main reason for this is that, after bringing out the White briquetting press in 1899 and demonstrating its success, the smelters of precious metal ores recognized the value of the new machine and took all of them that the manufacturers could produce.

However, the endeavor to settle, once for all, the problem of flue dust briquetting was not ended. It was realized that the solution of this problem was much more difficult than that of the handling of fines at precious metal smeltering works. A main reason is the fact that the tiny particles of iron flue dust as they are whirled about by the blast are rounded until each particle, when seen through the microscope, appears as round as a marble. In addition to this, each little piece of ore is covered with a greasy carbon coating, which seems to counteract the effect of a binder. For these reasons it has been difficult to find a binder that would give a briquette with all the conditions we were looking for. The difficulties may perhaps be better realized when it is known that the requirements call for a briquette that shall be hard and durable, waterproof, low in moisture, able to stand long transportation in open cars, not unduly refractory or liable to decrepitate or become dust again, and the binding agent must not injure either the lining of the furnace or the quality of the iron produced. The briquettes must be produced within a reasonable length of time, and the operation must be automatic, in that the material must not be handled from the time it leaves the dust bins until the finished briquette is produced. Moreover, with all of this, the cost must be moderate in order that there shall be practically no additional charge of expense to the furnace burden.

The experiments with the White mineral press clearly showed that the machine was impracticable for the briquetting of iron flue dust or, in fact, for the successful handling of any fine material of a gritty nature, owing to the reasons mentioned and to the fact that not enough pressure was obtainable. The inventor and myself went to work once more to do away with the faults that we had discovered in our first combined effort. The result of this was two more machines. One of them, known as the improved White mineral press, was patented in 1898. It is a disc machine, built largely on the lines of the first mineral press, but with many improvements, and is now unquestionably the best machine of this type on the market. Two of them are operating successfully at the smelter of the Broken Hill Proprietary Co., at Port Pirie, Australia.

But the main fault with both this machine and its predecessor lay in the large cost of repairs. The gritty nature of the flue dust acted as coarse sandpaper or emery on the molds and necessitated the frequent purchase of new discs. The discs could not be re-ground or renewed. It took three men nearly half a day to replace one; a new disc weighed 1,500 pounds, was five feet in diameter, and cost about $150. This heavy repair cost feature had to be eliminated.

The second machine patented in 1898, which we believed would do away with the faults shown by the mineral press, was an entirely new type, and was called the White briquetting press. Instead of a disc arrangement to carry the molds to the point where the pressure was exerted, there were six molds placed in a reciprocating press-box, into which spring and compression plungers were thrust, capable of exerting enormous pressure. These molds are simple in design, and can be removed and replaced at a nominal cost. As they sustained all of the wear, this did away with the enormous repair cost essential where an expensive disc was used. In addi tion we gained an enormous amount of pressure.

In the latter part of the year in which these two machines were brought out, a testing plant was fitted up in 32nd St., one of the plunger type presses was installed and the experimenting went on there for three years. Binder after binder was tested and careful records of each experiment were kept. During this time, the process of briquetting in a number of fields was perfected, but the successful handling of iron flue dust was still beyond our grasp.

A little over a year ago, the testing plant was shifted to the East End, where we had more room, and there a plant was fitted up, complete in every detail, with heating and drying apparatus so as to show the process of briquetting any fine material. The plunger press had been improved in many small details, although the principle of the machine remained the same. At last a binder was discovered that would hold iron flue dust, iron concentrates, or fine iron ores in hard and satisfactory briquettes, but it took 12 hours to dry them. A little more experiment and investigation, and we arrived at the point where we are to-day, with a patent binder and drying apparatus that gave us a continuous process for the briquettes from the flue dust bins to the finished briquette in cars or storage bins, the whole operation taking approximately half an hour.

After telling you some of the difficulties that have been en-

countered in solving this problem, it is well that you should know wherein lies the value of the process in the iron and steel industry. All of you know that flue dust exists and that large quantities are lost to the furnace owners. All of you have probably seen that fact practically demonstrated in Pittsburg to your annoyance. Now for a few figures:

In a blast furnace producing 600 tons of iron a day, the furnace burden approximates 540 tons of coke, 375 tons of limestone, and 1085 tons of ore—a total of approximately 2,000 tons. Assuming that the furnace managers use 80 percent of Mesabi ore, or 868 tons, and lose 8 percent of the Mesabi burden in flue dust (and these are under the actual figures if anything) what does this mean in dollars and cents? It means that every 24 hours the furnace owners are absolutely throwing away 70 tons of ore. Estimating the value of Mesabi ore in Pittsburg at $3.50 per ton, this means that the loss in flue dust alone is $245 per day, or $89,425 per year.

But this is not the only loss that is occasioned by the flue dust. As it is carried through the stoves by the blast it acts on their walls and on the boiler flues much as a sand-blast does, causing damage and wear. The heavy charge of fine ore in the furnace often causes clogging and slips, oftentimes resulting in explosions and heavy property damage, and sometimes loss of life. The amount of loss sustained in this way cannot be estimated in dollars and cents even approximately. In addition there is the damage to adjacent property owners and the annoyance resulting therefrom.

By the briquetting of the flue dust and the consequent reduction of the percentage of fine material used in the furnace, the flue dust could be saved to the furnace owners. Mind, I am not claiming that the briquetting of the flue dust would eliminate all of the troubles with which the blast furnace manager has to contend at present, but that they might be materially lessened.

There are even greater things that can be accomplished by briquetting. In 1901, using the figures and tables compiled by *The Iron Trade Review*, the total shipment of ore from the Lake Superior region was 20,589,237 tons. Of this amount, the Mesabi range contributed 9,004,890 tons, or about 44 percent. The amount of the total Lake Superior shipments that came to Lake Erie ports in that year was 17,014,076 tons. Of this total, Buffalo and Erie, which are the receiving ports for ores shipped to the East, received 2,854,763 tons. The rest went to Ohio, West Virginia, and Western Pennsylvania furnaces. At a rough approximation, the Pittsburg district, including the Mahoning and Shenango Valleys and Wheeling, received about 11,000,000 tons, and it is fair to assume that the total of Mesabi ores used in this district bears the same relation to the total of all ores used that the Mesabi output bears to the total Lake Superior output, viz.: 44 percent, or 4,840,000 tons.

Exact and careful analysis of all ore cargoes shipped from the Misabi range show that the ores carry a heavy percentage of moisture. In 1901, from a tabulated list of these analyses compiled by the ore agents of the big steel companies, the lowest percentage of moisture shown in the Mesabi shipments was in ore from the Franklin mine, and it showed 7.457 per cent. The highest percentage was in the Dailey ore, and amounted to 15.59 percent. The average amount of moisture in the Mesabi output from 52 mines for the year was 10.57 percent. In other words, the manufacturers of iron and steel in the Pittsburg district are hauling from Lake Superior, and paying freight, on 511,588 tons of water. The freight rate from the Mesabi range to Pittsburg is $2.35 a ton. On this basis, Pittsburg manufacturers are paying $1,202,231 a year for hauling water from the mines.

With the use of briquetting machinery, this waste in freight can be saved to the manufacturers, in addition to the elimination of the other evils of which I have spoken. It is quite possible to briquette the fine ores at the mines. After first drying the material by driving off the moisture and then pressing the fine ore into blocks, the raw material can be brought direct to the furnaces in this district as lump ore in briquettes that are waterproof, and that are abundantly able to withstand the rough usage essential in transportation. By this means all of the evils that must now be contended with arising from the use of fine ores can be absolutely done away with.

In this paper, I have been able to give only a rough outline of this seemingly simple but really complex question. I have said nothing of the immense field for briquetting offered by coke braize, culm, slack, iron sands and a host of other materials that we have experimented with, in addition to iron flue dust and fine iron ores. Suffice it to say that we have solved that problem and that the means are at hand for the iron and steel manufacturers of this district to do away with a large number of evils with which they are now contending.

Mr. Mould was asked many questions regarding his method of briquetting of iron ore and flue dust, the first questioner desiring to know in what way the moisture would be extracted from the briquettes and how they would be hardened and dried. Mr. Mould replied that the briquettes would be permitted to remain in a tunnel dryer for a period of 20 minutes and in a temperature of 500 degrees. This method resulted in the manufacture of a briquette that would withstand a fall of 20 feet without breaking. As to the binder he said that some experiments have been made looking towards the combination of the flue dust with coke, but he could not say how successful such experiments had been. As to the size of the briquettes, he said that they are made in two sizes, 3½ and 2 inches in diameter and 3 inches in thickness. One blast furnace superintendent asked what the approximate cost of a plant would be capable of briquetting 900 tons daily. Mr. Mould said that the approximate cost of such a plant would be $75,000 and the space it would occupy would be about 200x250 feet. The cost of maintaining such a plant in repairs, he said, would be about one-half cent per ton of briquettes produced. He also stated that the amount of binder used would average about one-half of one percent of the material in each briquette.

The following were elected to membership in the society: Adolph Frederick Christmas, designer, Westinghouse Machine Co.; Reinhardt Daae, Jones & Laughlin Steel Co.; Charles R. Dallas, Bullock Electric Mfg. Co.; Guy P. Thurber, Pittsburg Engineering Co.; A. J. Diescher, mechanical engineer, S. Diescher & Sons; Harry C. Gould, assistant engineer, U. S. Engineer's Pittsburg office; George T. Ladd, mechanical engineer, Bass Foundry & Machine Co.; Walter C. Kerr, president, Westinghouse, Church, Kerr & Co.; J. M. Merrill, manager General Electric Co., Pittsburg; Henry S. Mould, the Henry S. Mould Co.; F. Van McMullin, Heyl & Patterson, and Robert M. Pearce, engineer, P. & L. E. Railroad.

The New 14,500-Ton Cruisers.

(Special Correspondence.)

WASHINGTON, Oct. 20.—The Naval Board of Construction came to a decision Monday on the much mooted question of weights in the designs of the new armored cruisers Tennessee and Washington, and the majority recommendation now goes to the Secretary of the Navy. The leading opponents have been Rear Admiral Melville, chief of the bureau of steam engineering, and Rear Admiral Bowles, chief of the bureau of construction. The latter has urged a protective deck with four inches of steel armor on the slope, instead of the 1½ inches originally provided. The increase in thickness, it was explained, meant an increase of 200 tons in weight. Admiral Bowles insisted that the displacement should under no circumstances exceed the 14,500 tons stipulated, and suggested that 200 tons weight of the machinery be saved by reducing the horsepower from 25,000 to 23,000. He made the claim that the hull planned was of such improved pattern that it could be driven at the required speed of 22 knots with only 23,000 horsepower and substantiated this by a record of experiments. The chief engineer submitted calculations showing that 23,000 horsepower would produce a speed of but 21.7 knots. A majority of the board supported Rear Admiral Bowles and stipulated 2,000 tons, instead of 2,250 tons for which Real Admiral Melville contended, as the weight of machinery. Proposals for the two cruisers will be asked about Nov. 1.

The annual meeting of the American Locomotive Co. was held last week. The old directors and officers were reelected. After the meeting a director said that the business on the books of the company guaranteed steady work for the various plants for 18 months.

POWER FEED UNIVERSAL GRINDER.

The change that is now taking place in the method of finishing work through the introduction of powerful grinding machines is almost as radical as the change from an ordinary lathe to the turet lathe in the duplication of modern factory work, and the saving in cost is equally remarkable. The development of the modern grinder is an interesting story and the various problems encountered in the design and manufacture of a thoroughly satisfactory machine tool of this character involve some perplexities owing to the delicacy of the grinding methods and, as any mechanic of experience will readily agree, to the highly sensitive character of the grinding process. The application of the power to the wheel in such a manner that the action shall be perfectly smooth and at the same time powerful, is most desirable but it is well known that a heavy belt pulling in one direction not only causes great friction on the bearings, and where the pulley is small as must necessarily be the case on a grinder spindle the power that can be applied is quite limited and every rough spot in the belt is reproduced to a greater or less degree on the surface of the finished work.

POWER FEED UNIVERSAL GRINDER.

The power feed universal machine built by the Anderson Tool Co., of Anderson, Ind., shows an ingenious attempt to discard the use of the belt and by means of their method an armature is employed larger in size than a pulley would be for the same size of machine. Instead of having a heavy pull in one direction a steady pull is obtained entirely around the armature with a close approach to the ideal condition. The motors are designed by the company and are intended to be powerful enough to rough off work as fast or faster than would be accomplished in a lathe, the firm considering it only necessary on any class of work to take off one heavy cut in the lathe and then turn the piece over to the grinder.

The grinders as shown in the illustration are massively proportioned and designed for everyday shop use. The bearings are hardened and ground. The wheel motor swivels entirely on the face, is waterproof and is fitted with the best quality self-oiling hardened spindles. These spindles are made with extreme care and should run a long time without any adjustment. They are provided, however, with ample means for taking up both end and side play. The carriage and table are heavy, well ribbed, and are carefully scraped to standard plates. Ways are self-oiling and are entirely protected from dirt. The large hand wheel on front of machine moves the table either quickly by a rack feed, or by simply reversing the knob in center of wheel, it is changed into a micrometer feed reading by thousands, where it is necessary to face up to a shoulder or to face a piece of work held in chuck. The tables of these grinders act as an efficient water guard, both for plain and universal machines. Means are provided for getting a continual flow of water with a circulating pump, although the company strongly recommends using the regular city pressure as much better results are obtained than when using over again the gritty water from the wheel.

It is necessary for efficient grinding to have an abundant supply of water and with the improved construction an unlimited quantity can be used without coming onto the front of the machine or onto the operator. The machine is fitted with a set of dogs, chuck, face plate, wheel center, internal rig, steady rest and necessary wrenches, and is ready to operate just as soon as placed on the floor. All machines are made to rest on a three point bearing, and can be operated on any floor without a foundation, although it is preferable to have one when possible. The motors are controlled, started and stopped, and the speed regulated by an arrangement of switches placed on top of the wheel motor within easy reach of the operator. The controller is enclosed in a fire proof box. The machines are built in a variety of sizes and either plain or universal.

The illustrated price list of the Indiana Chain Works, Jeffersonville, Ind., is devoted to chains, chain dogs, cow ties, repair links, rings, etc. The company has recently completed new buildings and is manufacturing chain under rigid and individual tests.

During the 24 hours ending Monday evening, Oct. 20, the Rankin, Pa., plant of the American Steel & Wire Co., broke all previous records in the production of rods. The production during the two turns amounted to 601 000 pounds which breaks the best previous record of 556.000 pounds made at this plant last week for No. 5 rods.

HEARING ON THE DUTY ON IMPORT BILLETS.

(Special Correspondence.)

NEW YORK, Oct. 20.—The hearing given in this city last week by General Appraiser Jewell, on the question whether the duty on steel billets coming from Europe shall be levied on the basis of the price marked on the invoice, or the price the billets are commanding abroad at the time of their arrival in this country, was attended by a large number of leading importers of steel. Several of the importers were represented by counsel, but the latter were not allowed to take any part in the proceedings, the general appraiser announcing that he was seeking general information in the matter and was not concerned with its legal aspect.

The main argument was made by Mr. Hoyt, of the firm of A. Milne & Co., of this city. He said that last June his firm purchased 1,000 tons of billets in Germany on the basis of 76½ marks per 1,000 kilos at the maker's works in Germany. Recently, he declared, 300 tons of the order arrived in Philadelphia and the custom authorities there assessed the duty on them on the basis of about 97 marks per 1,000 kilos. Thus, under the provisions of section 135 of the Dingley tariff, the duty was made 4-10 cent per pound, instead of 3-10 cent, which would have been the duty if the price named in the invoice had been taken as a basis.

Discussing the financial aspect of the case, Mr. Hoyt contended that the action of the customs authorities in Philadelphia meant that his firm would have to pay duty at the rate of $8.96 per gross ton instead of $6.72 per gross ton. Besides the higher duty, his firm would be obliged to pay the penal duty provided by law, which meant that instead of the entire shipment costing about $2,000 duty, it would cost about $4,550, including the penalty, if the ruling of the Philadelphia appraiser were sustained. Mr. Hoyt dwelt at length on the action of the Philadelphia appraiser in decreeing that at the time the billets arrived on these shores, they were selling at about 97 marks per 1,000 kilos in Germany. He was at a loss to understand the sources of the Government's information, and was emphatic in his insistence that it was not to be relied upon.

The general appraiser asked Mr. Hoyt if he could give him positive proof that the Philadelphia appraiser was wrong in the price he took as the basis of the duty. Mr. Hoyt said that no better proof could be given on that point than that which was documentary in form, and said his firm would place in Mr. Jewell's possession every detail of the transaction under review, from the time it was given the order for the 1,000 tons up to the time the same was purchased and part shipment was made. Even on this offer Mr. Jewell showed a disinclination to question the action of his Philadelphia officer and stated that the Government's advices were that steel billets at the time of the hearing were selling in Germany on the basis of about 97 marks per 1,000 kilos. Mr. Hoyt replied that this price was made by a pool and was more artificial than real, and was not the open market price. Arguments along the same lines were made by Mr. Baerwald, the New York manager of A. M. Crane & Co., of Chicago, and representatives of the firms of Naylor & Co. and George B. Douglas & Co., all of which houses have made contracts for a large tonnage in foreign billets.

After every one who wanted to speak had been afforded an opportunity to do so, Mr. Jewell announced that he would reserve his decision in the matter.

In speaking to a representative of *The Iron Trade Review*, Mr. Hoyt said: "We presented our case to the general appraiser with all the force of which we were capable. From what Mr. Jewell told our counsel, however, I am of opinion that he will decide against us. We will then have the right to appeal to the board of general appraisers, which convenes in this city. Should this body rule against us also, we have made up our mind to carry the case to the United States Supreme Court. I understand that this court would take the matter up immediately, so that the usual delays in litigation will be avoided. Our lawyers are in hopes that we will not be compelled to take this extreme course, but we are prepared to do it if necessary.

"The action of the Government authorities has brought the importation of foreign billets to a standstill. While this matter is pending, no contract for them will be entered into. At the present time there are outstanding orders for about 50,000 tons of foreign billets, all of which are affected by this controversy. If the action of the Philadelphia appraiser should be sustained, it will be a serious matter with independent mills that manufacture steel bars, sheets, wire and wire rods. Everybody knows that these mills cannot obtain the steel billets they require in this country, and must go abroad for them. In consequence of the scarcity of steel billets in this country prices are high, yet if a duty of 4-10 cent per pound is imposed on foreign material, the imported billets will cost more than domestic steel, while at the present price of billets in Germany, with 3-10 of a cent per pound duty added, they can be had at seaboard points for about $28 to $28.50 for base sizes. When you add the inland freight to this, your foreign billets are on a parity with the normal price of domestic ones."

Mr. Baerwald said: "I fail to see the propriety of assessing duty on billets on the basis of about 20 marks higher than what has been actually paid for them, and as the invoices show. Our company buys in wholesale quantities, and we have bought 10,000 tons of billets at one time. Besides, it is not an unusual thing for orders to be given for 5,000 tons. Now purchases of this proportion are not made in Germany. Over there the man who wants billets in such quantities does not enter the open market for them, but produces them himself. Consequently to take the domestic market value in Germany as the basis for levying the duty is improper. It is unstable and it is fictitious. Then I look upon it as unfair to make importers swear to paying prices for billets that they did not pay. I can show, for example, that our company has been purchasing billets abroad in the open market for from 65 to 72 marks, and why, therefore, should we be called upon to swear that we paid in the neighborhood of 97 marks. Yet that's what the Government's contention means.

"If we are beaten in this matter, importations of steel billets will be brought to an abrupt stop, for users would not be able to sell the finished product at a profit. Establishments relying on foreign supplies will have to close. Thousands of men may be thrown out of employment, and the revenues of the Government will be considerably lessened. In a word, I know of nothing which effects our industrial prosperity at the present time so vitally as this."

WASHINGTON, Oct. 21.—It is stated at the Treasury Department that the New York board of general appraisers will be a final court, so far as the department is concerned, in the matter of the Philadelphia decision in the billet duty. The customs officials have had few if any parallel cases. A high official of the Treasury Department said today: "It is always the aim to have our customs appraisers place valuations which represent the actual marketable value in the country from which any given consignment is exported. We are not concerned as to whether in the transfer of ownership of the goods they have been given gratuitously or disposed of for prices that are manifestly exhorbitant. Our whole thought in the matter is to determine in as equitable a manner as possible the actual market value of the product at the point of sale. In cases where, as in the present one, a sliding scale of prices appears to obtain for the same article this estimate must of course be largely a matter of personal opinion."

N. A. Christensen, of Milwaukee, announces that the Christensen Engineering Co., with which he has been connected as superintendent since its organization and of which he is still consulting engineer, and with which his other interests remain undisturbed, will hereafter manufacture his air compressors connected with air brakes exclusively. This places under his control the manufacture of air compressors for all other uses. The air compressors furnished by him will be manufactured by the Christensen Engineering Co. under his designs, specifications and inspection. This arrangement also leaves Mr. Christensen free individually to extend his system of air compressors in a rapidly widening field. There are now in use over seven thousand of these compressors of all sizes and capacities constructed under his patents and used for various purposes. Mr. Christensen's engineering and sales offices are located in the Herman building, corner of Wisconsin St. and Broadway, Milwaukee.

The Rapid Tool & Machine Co., of Cincinnati, made an assignment Oct. 20. Assets, $1,500; liabilities, $2,000.

THE BONAR STEAM TRAP.

The Bonar steam trap, manufactured by James Bonar & Co., of the Carnegie Bldg., Pittsburg, is illustrated in the accompanying half tones, Fig. 1 showing an end view, while Fig. 2 is a sectional view of the trap tilted and discharging. The trap casing is suspended on trunnions and the drain pipe is connected to the journal on the inlet trunnion, the water passing through the inlet trunnion and the pipe to the short end of the cylinder, and accumulating on top of the shefl until the water overflows and gradually fills the body of the casing. One end of the cylinder is longer than the other as measured from the center of the trunnions and is at the same time lighter in weight, but the long end naturally becomes the

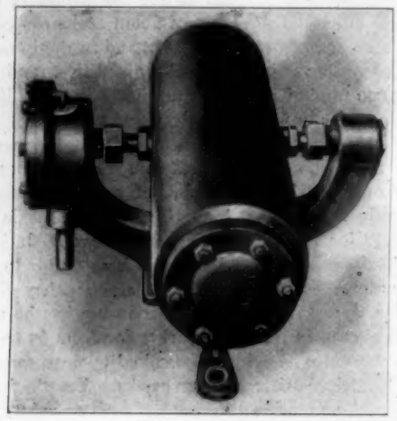


FIG. 1.—THE BONAR STEAM TRAP.

heavier as the entrained water accumulates and the trap tilts to the position shown in Fig. 2. In falling to this position the water in the short end and above the shelf is immediately thrown to the other and the lowest extremity (the shelf assuming a horizontal position) ensuring a prompt and positive action.

The trunnions are part of the cylinder and move with it. Fastened to the end of the outlet trunnion is a ball type discharge valve. When the cylinder tilts, this valve moves with the trunnion and in the bottom of the valve is a loose pin in an open guide which comes in contact with a projection in the valve casing and lifts the ball off the seat. The pressure in cylinder therefore blows the water through the inner discharge pipe, trunnion and valve, where it escapes to a discharge connection in the bottom of the valve case. The short

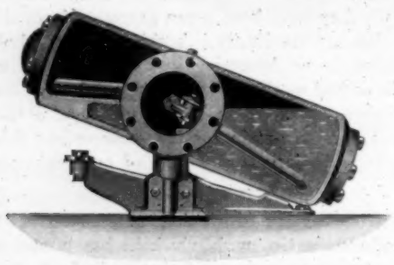


FIG. 2.—SECTIONAL ELEVATION OF BONAR STEAM TRAP.

end of the cylinder being the heaviest brings back the trap to a horizontal position as soon as the water is blown out of the casing and the device is again ready to repeat the cycle of operations.

There is an adjustable screw for lowering or raising inlet end of the cylinder for the purpose of regulating the tilting capacity and the speed of the trap action can be easily controlled. Should the condensation be heavy, as by a flood of water from boiler or other causes, the trap will remain open with a continuous discharge. The trap is arranged to use several types of valves but long experience has induced the manufacturers to adopt the ball valve on the score of simplicity and the avoidance of packing, etc.

Craig, Ridgway & Sons, West Chester, Pa., have arranged to import a shipload of coke from England.

NAVY EXPERIMENTS WITH FUEL OIL.

(Special Correspondence.)

WASHINGTON, Oct. 21.—Great importance attaches to the experiments now being conducted under the direction of the Navy Department to determine the value of liquid fuel. The three commissioned officers who comprise the liquid fuel board are being assisted in their experiments by three warrant machinists and the crew of the torpedo boad Rodgers which has been detailed for duty in this connection. Congress made an appropriation of $20,000 for carrying on a thorough investigation, and the Navy Department also has at its disposal for the work a balance of over $7,000 from a previous appropriation. The resources of the liquid fuel board have been still further extended by the Oil City Boiler Works placing at their disposal a marine boiler capable of developing 2,000 horsepower under forced draft. The findings of the board now at work will be compared with the statistics secured during an exhaustive series of tests with the same boiler in which various kinds of coal were used as fuel.

The oil fuel experimental plant now in operation in this city is marvelously complete. There are facilities for weighing every pound of oil burned and water evaporated; arrangements whereby the temperatures and draft pressures of the ash pit, furnace, back connection, front combustion chamber and base of the smoke stack are ascertained and recorded; and finally facilities for immediately analyzing the escaping gases to detect whether complete combustion is being effected. The investigations of the Navy Department upon liquid fuel will cover the following points:

1. Its evaporative efficiency as compared with coal.
2. The degree to which its consumption can be forced.
3. The value of liquid fuel bricquettes as a combustible as compared with coal and oil.
4. The relative value of steam and air as atomizing agents for spraying the oil.
5. The simplest and best means of heating the air requisite for combustion, since it is exceedingly probable that the gasification of the oil product is greatly assisted by heating the air entering the furnace.
6. The effect of oil upon the tubes and plates of the furnace.
7. The simplest and best means of oil storage.
8. Precautions to be taken to prevent fire or explosion.
9. Comparative value of leading types of burners.

It is the understanding that the board in their official report will attempt very few deductions, rather allowing the valuable detailed data secured to speak for itself. That it will do this sufficiently clear to enable those interested in the subject to form their own conclusions is amply attested with the information thus far secured. The Navy Department is not only endeavoring to test the oil product of all sections of the country but is permitting the leading manufacturers to attach their various patented oil burners to the experimental boiler.

Commander Edwards, U. S. N., senior member of the liquid fuel board, says that it will not be the navy but the country at large that will be the great beneficiary of the experiments now in progress. He predicts that when the results are made public there will be imparted a surprising impetus to the use of oil fuel. The tests will be continued at least six months longer and Congress may be asked at the next session for an additional appropriation to prolong them still further.

WASHINGTON, Oct. 21.—Excellent progress is being made in the two new buildings for the use of the National Bureau of Standards in this city, and it is hoped that the officials of this new branch of governmental activity will be established in their permanent quarters by July 1 next. The two buildings now under way will cost when completed, $325,000. Several other buildings are in contemplation, but they will not be supplied at once. In addition, however, to the expenditure of upward of a third of a million dollars for the structures to house the bureau, the sum of $40,000 will be immediately expended in equipment.

The Dayton Pattern & Model Works, of Dayton, O., announce the occupancy of a modern five-story building, specially designed for the economical production of patterns. It contains 20,000 square feet of floor space.

THE FRACTURE OF PIG IRON.

The fracture of a freshly broken pig indicates to the fracture expert the characteristics of an iron almost as accurately as does an analysis. The chemist, by a study of fracture in connection with analysis, should become more accurate in fracture indications, than the expert who is not a chemist, and he should be able to say from the fracture about the percent of combined carbon, graphite, silicon, sulphur, phosphorus, etc., an iron contains, and indicate whether it will run hard, soft, strong, weak, open, dense, etc., when melted and cast.

In making such a study, analysis should be made from near the sow end, tail end and center of the pig, and a system of averages established both of fracture and analysis. By such a system the average percent of the various metalloids contained in an iron may be determined by one analysis from near the center of the pig, and the number of determinations and amount of laboratory work reduced to a minimum. And more time given to the chemist to look after the cupola and the mixing and melting of iron.

In cast iron, the characteristics of the iron are indicated by the size, shape and color of the crystals, and are more plainly seen in the fresh fracture than in an old fracture, the colro of which has been changed to a greater or less extent, by action of the atmosphere upon the iron.

A very hard iron in the pig has a very small whitish crystal, which, giving to the fresh fracture a whitish appearance, designates it as a white iron. This iron runs very hard in light as well as heavy work. In a mottled iron we find a larger crystal of a bluish cast, with white thread-like streaks winding around among the crystals, which designates it a mottled iron. This iron generally runs strong and close in heavy work, but very hard in light work.

A No. 2 iron has a small crystal similar to that of a mottled iron, but without the thread-like streaks within the crystals. This iron runs soft and very close in heavy work, gives a fine finished surface in planed, turned or bored work, but generally runs hard in light castings.

The fracture in No. 1 iron presents a large crystal of a dark bluish cast, and generally runs soft in light or heavy work, but in the latter is very open and porous, and does not give a bright surface when finished. And for finished work has to be mixed with scrap or pig having a smaller crystal.

In the silver gray iron we find a very small crystal similar to that of a white iron, and it is only distinguished from the white iron by the silvery gray color from which it receives its name. This iron runs very soft in either light or heavy work, but is so rotten in the pig and when cast that it cannot be used alone for either light or heavy work.

A high silicon iron may have a large or small crystal, but always has a silvery gray cast of color, and like silver gray iron, is too rotten to be used alone.

The charcoal irons have a different shaped crystal from the anthracite or coke irons. It is smaller than that of the No. 1 iron, more pointed and sharper to the touch than those of any of the grades of these irons. The sharp pointed drawn out crystal indicates strength in the iron.

The chemist, by careful study of fracture in connection with analysis, should be able to overcome this difficulty and indicate from fracture the exact characteristics of an iron in the pig and when cast.—[Edward Kirk.

Bids on Plates and Cranes for Navy Yards.

(Special Telegram.)

WASHINGTON, D. C., Oct. 21.—Bids were opened today on supplies and equipment for the Boston Navy Yard. The following are lowest bids: 32,500 pounds angle steel, R. C. Hoffman & Co., Baltimore, $1,251.25; 54,000 pounds steel boiler plates, Brown & Wales, Boston, $1,350; 20,500 pounds steel boiler plates, Brown & Wales; 3,000 pounds flat bar iron, Monongahela Iron & Steel Co., Pittsburg, $147; two electric traveling cranes, New Jersey Foundry & Machine Co., New York, $4,690. For the Mare Island Navy Yard, on 85 tons of medium steel plates, the bid of R. C. Hoffman & Co., Baltimore, was lowest at $5,720.

Among the recent shipments of the Tabor Mfg. Co., Philadelphia, was a carload of molding machines of the vibrator frame type to a large New England hardware manufacturer. An order has been booked for 17 additional molding machines for the New York Air Brake Co.

The Taylor-Forbes Co., Ltd., Guelph, Canada, is the successor of A. R. Woodyatt & Co., who had been carrying on the manufacture of hardware and lawn mowers for many years. Owing to the death of Mr. Woodyatt, it was necessary to reorganize. The officers of the Taylor-Forbes Co. are: President and general manager Jno. N. Taylor; secretary and treasurer, Adam Taylor; vice president, George D. Forbes; assistant secretary, Joseph A. Hewith; general sales agent, Harry R. Moulden. The capital stock is $300,000.

The talk of a consolidation of numerous forge companies of the country, including plants in Cleveland, Pittsburg and Buffalo, has been revived. General Manager Coe, of the Cleveland City Forge & Iron Co., says that a proposition has been made to that company to purchase its plant, but he does not know whether it is the purpose to purchase the plant to place it in a consolidation.

The United States Steel Corporation is sinking six great shafts at various mines on different ranges. The largest ever made in the Lake Superior region will be at the Chapin mine, Iron Mountain, Mich., where the shaft will have a net size between the timbers of 10x24 feet. At the Norrie, Gogebic range, a shaft that will be 1,300 feet deep is going down; at the Savoy, at Ely, one that will be 1,300 feet. Most of them will be lined by non-combustible material, and each is supposed to have a capacity of not less than 500,000 tons.

The Lloyd Manufacturing Co., of Pittsburg, which has been operating a small plant in Allegheny, Pa., for the manufacture of a coal mining machine, patented by F. C. Lechner, formerly connected with the Jeffrey Manufacturing Co., of Columbus, O., has increased its capital from $150,000 to $300,000. A large and complete plant for the manufacture of these machines is to be erected immediately. The Lloyd company is organized with the following officers and directors: C. H. Lloyd, president; Stephen Newburn, vice president; John C. Donehoo, secretary and treasurer; James F. Richards, F. C. Lechner and F. G. Andrews. The directorate is to be increased to seven members.

The Leckrone Coke Co., of Uniontown, Pa., organized in August, has completed a plant near Leckrone, Pa., in the Connellsville region. Some of the ovens have been fired and the company is now offering coke to the trade. The vein of coal is the same as that from which the Frick Coke Co. is mining at its Leckrone works of the Southwest Connellsville Coke Co.

The Pittsburg & Lake Angeline Co. is exploring for ore just east of the old Winthrop mine, upon property locally known as the Mitchell, for many years operated under lease by the Winthrop Iron Co. The company is owner of the fee, and is anxious to find ore which should be of good quality agreeing with that mined in the past. This company has a fine showing of silicious ore just north of No. 3 Winthrop pit.

The Florence mine, Menominee range, has been greatly improved under the direction of General Manager Vogel. If the shipping season continues until about the middle of next month, and the management is not hampered by a scarcity of cars, and vessels, the Florence mine will ship a total of 135,000 tons of ore this season and there will be no ore left in stock. Besides loading from the stockpile, an average of 650 tons of ore is being mined, loaded directly into the cars and shipped daily.

The Capital Coal & Iron Co., Nashville, Tenn., has floated $600,000 worth of its bonds, the American Guarantee Co., Chicago, doing the underwriting. Gov. Benton McMillin is president of this organization, which has purchased 20,000 acres of coal and iron land on the Nashville, Chattanooga & St. Louis Railroad. This land is located in the Sequatchie valley, and is said to be rich in coal and iron. Mines will be opened and coke ovens to the number of about 300 erected as soon as possible.

INDUSTRIAL SUMMARY.

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

New Buyers in the Market and Some of their Wants:—

The Chicago Compressor Co., Chicago, has been chartered to manufacture and deal in all kinds of compressors and refrigerating machinery. Capital, $100,000.

The Michigan Steel Casting Co., Detroit, has been incorporated with a capital of $300,000 to manufacture steel castings.

The York Corrigation Co. has been incorporated with a capital of $25,000 to manufacture metal cornices and will build a plant at Eberton, Pa.

The Standard Electrical Mfg. Co., of Niles, O., F. E. Etillwagon, president, has increased its capital from $30,000 to $75,000.

The Pacific Tin Plate Co., recently organized by workers in tin plate mills at Gas City, Ind., will build mills near Los Angeles, Cal., whose citizens have donated 30 acres and have agreed to take $75,000 of stock in the company.

The Raleigh Iron Works Co. has been incorporated at Raleigh, N. C., with capital stock of $15,000, and elected T. L. Eberhardt, president; William T. Harding, secretary. An established plant, to be enlarged and improved, has been acquired.

W. E. Reynolds, F. W. Gates, G. R. Lynch, S. W. Weats and Robert Davidson have incorporated the National Disc Plow Co., at Nashville, Tenn., with capital stock of $30,000, for manufacturing plows. They will contract for manufacturing on a royalty.

The Nashville Bridge & Construction Co., will increase its capital stock from $10,000 to $30,000 and erect additions to its plant. Additions will include two buildings, one to be equipped as a forge and the other as a bridge shop.

H. J. Reesink & Co., Zutphen, Holland, want estimates and date of delivery (packed, crated and delivered f. o. b. on steamer at Philadelphia, New York or Baltimore) on bright-polished hexagon steel bars.

Ludwig Moll, Dusseldorf, Germany, is seeking agency for rawhide gearing and kindred product.

Liddell Machine & Supply Co., Montgomery, Ala., wants an Ingersoll milling machine.

Lock Box 307, Chattanooga, Tenn., wants double-end punch and shear 1x1 inch, 10-inch throat; eleven 500-pound drop hammers, three 90 to 100-pound trip hammers, and medium heavy bulldozer.

James C. Slater and Ida Heidt have incorporated the Heidt Plow Co., at Savannah, Ga., with a capital of $50,000.

The Champion Iron Works Co. has been formed at Crowley, La., taking in Champion Iron Works and American Foundry & Machine Shop, capitalized at $25,000, with Henry Loewer, president; M. D. Abbott, vice president, and Ben Stagg, secretary. The company is building another structure 84x180 feet for its light machine work and blacksmithing.

The Batchellor Pneumatic Tube Co., St. Louis, capital stock $10,000, has been incorporated by A. P. Coakley, Frank J. Cabot, Wm. C. Woods and others.

The Heine Safety Boiler Co., operating extensive works at St. Louis, has increased its capital stock from $100,000 to $430,000.

At Three Rivers, Mich., W. W. French and L. B. Place are organizing a company with $10,000 capital to operate an iron foundry.

At Baltimore, Md., a new company is being organized to operate an extensive steel casting plant at South Baltimore. The prospectus provides for a capitalization of $2,100,000 of which $1,500,000 will be common and $600,000 7 percent preferred stock. The company will make a specialty of railroad castings.

The Findlay-Graves Foundry Co., of Buffalo, N. Y., has been incorporated with $30,000 capital for the purpose of operating an iron foundry. R. G. Findlay, Charles Otten and M. F. Otten are the incorporators.

The National Spring & Wire Co., of Albion, Mich., has been incorporated with $10,000 capital.

The Clarksburg Galvanized Iron Works, of Clarksburg, W. Va., has been incorporated with $20,000 capital for the purpose of operating a galvanizing plant. E. A. Batten is the promoter of the enterprise.

The Burdick & DuBlois Manufacturing Co., of Los Angeles, Cal., has been incorporated with $50,000 capital to manufacture tools and mechanical devices. E. A. DuBlois and L. J. Burdick are the incorporators.

The Knickerbocker Machine Works, of New York, has been incorporated with $10,000 capital by J. P. Lenz and S. R. Magaw.

The Globe Foundry Co., of Peoria, Ill., has been incorporated with $6,000 capital to engage in the operation of a foundry and machine shop. H. V. Finkelstein, W. S. Martin and H. B. Neff are the incorporators.

The Toledo Stamping Co., of Toledo, O., has been incorated in New Jersey with $300,000 capital. It absorbs the Toledo Tube Co., which is capitalized at $50,000 and comes into possession of all the property owned by that corporation. The tube company has not been manufacturing tubing for some time, the entire output of the plant consisting of shovels. The new company will engage in the manufacture of shovels, scoops, skillets and stamped articles on a much larger scale and a large amount of stamping machinery will be installed. Two new buildings are to be erected immediately, one 100x400 feet and the other 30x400 feet. I. N. Humphries is president and treasurer of the company; C. R. Miller, vice president and general sales agent and L. M. Bateman is secretary and general manager.

The Graham Foundry & Machine Co., whose plant at Monongahela, Pa., was recently destroyed by fire, will rebuild in a better location in the same city as soon as plans can be prepared. The company is to be reorganized and incorporated. It will need considerable new equipment and having lost all catalogs and price lists would be pleased to have manufacturers send new ones.

The Cincinnati (O.) Electrical Tool Co. has been incorporated with $15,000 capital.

Fires and Accidents:—

A portion of the rolling mill of the Republic Iron & Steel Co., Birmingham, Ala., was recently destroyed by fire, with a loss of $10,000.

The plant of the Lakeside Iron Works, Muskegon, Mich., was recently destroyed by fire. Loss, $15,000.

New Construction:

At the next annual meeting of the stockholders of the Quincy Engine Co., Quincy, Ill., a proposition will be presented to them providing for an increase in the capital stock to $400,000. The increased capital will be expended in practically doubling the present capacity.

Scheerer's Sons, manufacturers of wire and wire goods, Buffalo, N. Y., will erect a four-story brick factory at Nos. 65 and 67 Jackson street at a cost of $16,000.

The Morris & Lewis Co. will erect a large foundry and machine shop at Rock Island at a cost of $30,000. The machine shop will be two stories high and will be 300 feet long and 80 feet wide. The foundry will be 40x100 feet. An office building and a cleaning department will also be included in separate buildings.

The Oklahoma Mfg. Co., Hobart, Okla., which was recently incorporated with a capital of $16,000, for the purpose of manufacturing farm and other machinery, expects to have the best equipped foundry and machine shop in the Territory. The erection of the new buildings will be commenced at once. Nearly all machinery required has been purchased. The organizers of the company are: J. W. Bartlett, from Moline, Ill.; G. W. Compton, from East Moline, Ill.; J. K. Spears, from Paris, Ky.; E. C. Printz and A. W. Lumm, of Hobart.

The Automatic Machinery Co., of Aurora, Ill., is erecting an addition to its plant that will cost approximately $50,000 and which will increase the number of employes from 200 to 500.

R. Scheidler will erect a boiler shop at Newark, O., which will be 40x80 feet.

The S. Wilks Manufacturing Co., Chicago, is erecting a tank works to cost $50,000 and which will be 100x175 feet in size.

The Standard Gauge Steel Co., Beaver Falls, Pa., is erecting three new buildings. The largest will be used as a ware-

house and will be 41x157 with a traveling crane its entire length. The second building will be 41x61 feet and will be used as a pattern shop and stock house and the third building will be 48x48 and will be used as a boiler house.

The Grand Rapids Foundry Co., Grand Rapids, Mich., has purchased land adjoining its plant which will be used for the purpose of making a large addition to the present foundry.

The J. George Leyner Engineering Works, of Denver, Col., which has been incorporated with $650,000 capital, will erect an extensive plant for the manufacture of mining machinery. The plant will probably be located near Denver and will consist of a foundry 100x144 feet, pattern shop 50x164 feet, machine shops 100x224 and 75x224 respectively, blacksmith shop 60x204 feet and a warehouse 75x204.

The National Malleable Castings Co., Indianapolis, Ind., will erect an addition to its foundry at a cost of $4,000.

The Erie Engine Works, Erie, Pa., are laying the foundations for a foundry which will be built of brick and will consist of a building 70x150, to be used as the main foundry, and another 40x60 for cleaning castings, etc. It will be electrically equipped with cranes, elevators, etc.

The Grand Rapids Foundry Co., Grand Rapids, Mich., has purchased additional land and will double the capacity of the present plant by erecting a new brick building.

The Niles-Bement-Pond Co. will erect a three story machine shop in Philadelphia at a cost of $30,000. It will be 50x213 feet.

The City & Suburban Homes Co., Detroit, will build a stove manufactory at a cost of $12,000.

The Chicago Junction railway has leased to the Green Engineering Co. a strip of land, 75x600 feet between 35th and 36th Sts., Chicago, for ten years at a rental of $480 a year. The lessees will erect at that place a series of freight houses, 30x250 feet, where they will assemble the parts of the machinery which they manufacture and distribute the completed product from that point. They will eventually erect foundries and other buildings, involving an expenditure of $50,000.

The Globe Foundry Co., Cincinnati, is negotiating for the purchase of a site for a new plant.

Bids have been received on the new plant of Henry A. Hitner's Sons, scrap dealers of Philadelphia. The buildings include a crane house and storage shed, 435 feet 9½ inches by 54 feet 10 inches in dimensions; a stable 82 by 38 feet; an office 49 by 37 feet 6 inches by 75 feet 6 inches by 46 feet; an engine and boiler house, 41 by 21 feet 6 inches, and a metal house, 70 by 55 feet.

The Morris & Lewis Foundry Co., Rock Island, Ia., will build a plant at a cost of $30,000. The plant will consist of four brick buildings. The main building, which will be 80x300 feet, is to be the machine department. It will be two stories. The molding department will be one story with a flat roof and a sky light and will be 40x100 feet. The grinding room and office will be in separate buildings.

Henderer & Sons, Wilmington, Del., will build an addition to their machine shops at a cost of $6,500.

The Elkhart Frog & Crossing Co., Elkhart, Ind., has purchased a site and will soon build a plant.

The Aurora Automatic Machinery Co. has begun the erection of a two story addition which will cost $50,000. It will be completed by Dec. 1.

The Brown-Ketcham Iron Works, Indianapolis, Ind., will erect a large plant at Greensburg, Pa., for the manufacture of beams and columns. They expect to have the plant ready for operation in January. The main building will be of steel, 56x300 feet, and the assembling room will be 120x44 feet.

The plant of the Atlanta Car Wheel & Mfg. Co., Atlanta, Ga., will be in operation within 30 days.

The Seaboard Steel Casting Co., of Chester, Pa., has decided to make enlargements and improvements to its foundry plant. The proposed changes will include the erection of a steel building, connected with the main foundry, for the purpose of storing flasks. This building will be equipped with a traveling crane. A large new drying oven will also be constructed, and an additional furnace put in, making three of the latter, each of 25 tons melting capacity, which will enable the running of two furnaces at all times, with one in reserve for repairs.

The Meadville Malleable Iron Co., Meadville, Pa., is increasing its capital and will enlarge its works early next year, putting in a new melting furnace and other additional equipment, whereby it expects to double the capacity of the plant.

The Globe Foundry Co., manufacturer of castings, Cincinnati, is negotiating for the purchase of a site for a new plant.

The Rochester Iron Works, Rochester, Minn., are building an addition, 30x46 feet, which will be used as a foundry.

Scheerer's Sons, Buffalo, wire manfacturers, are planning to erect a four-story brick building at a cost of $16,000.

Contracts have been let by the Pennsylvania Railroad for the steel work for a number of new buildings as part of its new shop plant at Shellpot, just outside of Wilmington, Del. There will be 12 buildings in all. Those included in the contract which is let to the Phœnix Iron Co., are the boiler and machine shop, blacksmith shop and planing mill.

The plans of the B. & O. Railroad for improvements at Holloway, O., and Painesville, O., provide for roundhouses of 23 stalls, the inner diameter being 200 feet, and the outside diameter 382 feet. Each will have an 80-foot turntable and an oil and store house of brick, one story high and 30x150 feet. The other buildings include a carpenter shop, machine shop and coaling station.

The Baldwin Casting Co., of Parkersburg, W. Va., recently chartered with $30,000 capital, will build a plant for producing iron, brass and cast steel goods of all kinds, principal output to be steel castings ranging from 1 to 1,000 pounds to a casting. Main building will be of brick, 40x150 feet, equipped with furnaces, core ovens, natural gas supply, 25-h. p. gas engine, etc. W. H. Patton is architect for building. H. B. Hogg is president; A. M. Stiles, vice president, and L. C. B. Carpenter, general manager.

The Victor Talking Machine Co., Camden, N. J., will erect a four story addition, 30x102 feet, of brick and steel.

An addition will be built to the foundry and machine shop of Thos. Bailey & Co., Athens, Ga.

The Pittsburg District:—

The pressed Steel Car Co. will erect an elaborate office building adjoining its plant at McKees Rocks, Pa., at a cost of about $50,0000. The building will have upward of 30 rooms and will contain all of the offices of the company.

The offices and warehouses of the Follansbee Brothers Co., manufacturers of and dealers in tin plate and metals, have been removed from Second avenue to their large warehouse at Third and Liberty avenue.

The Railway Steel Spring Co., the latest consolidation of steel spring manufacturers, capitalized at $27,000,000, has absorbed the plant of the Railway Spring & Mfg. Co., located at Washington, Pa. The latter concern was capitalized at $200,000.

The main offices of the McClintic-Marshall Construction Co. have been removed from the Park Building, Pittsburg, to Rankin, Pa. The company recently secured a contract from the Union Steel Co. for the erection of ore and coke bins at Donora, Pa., requiring about 6,000 tons of steel.

The Keystone Coal & Coke Co., of Greensburg, Pa., has contracted with Wm. B. Scaife & Sons Co., of Pittsburg, for a large filtering plant for its water works at Madison, Pa. Among other recent contracts taken by Wm. B. Scaife & Sons Co., for the Scaife and We-Fu-Go water filtering systems, of which they are the sole manufacturers, are the following: Union Steel Co., Donora, Pa., 500,000 gallon plant; Lancaster Mills, Clinton, Mass., 1,000,000 gallon plant; W. D. Boyce Paper Co., Marcellus, Ill., 1,000,000 gallon plant; Thos. Phillips Co., Akron, O., 750,000 gallon plant; Gibson Mfg. Co., Concord, N. C., 125,000 gallon plant; Carroll Hotel, Vicksburg, Miss., complete filtering system.

General Industrial Notes:—

Ten mills of the Sharon Tin Plate Co., Sharon, Pa., resumed operations this week. The remainder of the plant continues idle and no date has yet been fixed for its resumption.

A receiver has been appointed for the Grant Tool Co., of Franklin, Pa. The liabilities are placed at $230,000 while the assets are said to aggregate $550,000.

At a meeting of the newly incorporated Colorado Steel Castings Co., of Colorado Springs, Col., officers were elected as follows: J. K. Vanatta, president; John I Franklin, vice

president; Francis J. Hobbs, secretary; John F. Sanger, treasurer and C. F. Springer, general manager. Work on the new plant will be commenced immediately.

Twenty-four of the hot mills of the Elwood, Ind., plant of the American Tin Plate Co. resumed operations last week. All the mills would be on at present but for the fact that extensive improvements to the boiler plant are being made.

With but few exceptions, all the mills of the Etna-Standard plant of the American Sheet Steel Co., at Bridgeport, O., are in operation again. Seventeen mills are now operating at their utmost capacity and there is every indication that sufficient orders will be closed shortly to necessitate the operation of the remaining six mills in the near future.

The pattern shop of the Sharon Foundry Co., at Wheatland, Pa., is completed and work on the erection of the foundry will be commenced by the Riter-Conley Manufacturing Co. within a few days. The new plant will make a specialty of steel castings and ingot molds.

The Penn Bridge Co., of Beaver Falls, Pa., has been awarded the contract for the erection of the steel work of the government building at the Louisana Purchase exposition, St. Louis, Mo. The contract price was $129,570 and about 2,000 tons of steel will be required.

During September the American Steel & Wire Co. made foreign shipments of wire and wire nails through Eastern seaboard points to the amount of 5,300 tons. The shipments of wire aggregated more than 4,000 tons.

The extensive additions to the plant of the Ohio Falls Iron Co., New Albany, Ind., are nearing completion and will be in operation about Nov. 1. The output of the plant will then be more than doubled.

Owing to the delay in securing material, the open-hearth plant of the Sharon Steel Hoop Co., Sharon, Pa., will not be placed in operation before Feb. 1, 1903. The two finishing mills will not be completed before that date.

The pipe exports of the National Tube Co. through Eastern seaboard points for the month of September amounted to 2,167 tons, the shipments to Africa leading with 1,425 tons.

The Georgia Coal & Iron Co., of Chattanooga, Tenn., which recently purchased the Rising Fawn Furnace, at Rising Fawn, Ga., expects to blow in the stack about the first of the year after making extensive repairs and enlarging the furnace considerably. The stack at present has a capacity of 100 tons daily, but when repairs are completed will produce about 200 tons per day. About $100,000 will be spent in improvements. The company is at present considering the erection of two additional furnaces but no site has as yet been decided upon. George F. Hurt is general manager.

The recently incorporated Baldwin Casting Co., of Parkersburg, W. Va., has organized as follows: Herman B. Hogg, president; Albert M. Stiles, vice president; L. C. B. Carpenter, treasurer and general manager. A gray iron foundry 40x150 feet will be erected.

The Industrial Works, Bay City, Mich., has received an order from the United States government for four large locomotive cranes to be shipped to various Government naval stations. Up to date this company has received orders for sixteen cranes from the Government.

The new nut and bolt works of the Jordan Manufacturing Co., Tacoma, Wash., are fast nearing completion and will be placed in operation within a few months. The main building is 50x100 feet and will contain a number of machines built by the Acme Machine Co., of Cleveland. The officers of the company are H. C. Jordan, president and general manager; W. H. Kerwin, vice president; A. G. Keene, treasurer and W. P. Jordan, secretary.

The new foundry of the Colorado Fuel & Iron Co., at Pueblo, Col., is already under roof and the cupolas and other foundry equipment are being installed. The first cast will be made within a month.

The Whitaker Iron Co., Wheeling, W. Va., will have three additional 26-inch sheet mills in operation about the first of the year. The foundations have been erected and the mills are now under erection.

The Lorain Steel Co., Lorain, O., has secured a contract for special track work for an extension of the electric traction system of the city of Newcastle-on-Tyne, England.

The Olive Hill Fire Brick Co., Wheeling, W. Va., recently received an order from the Semet-Solvay Co., of Syracuse, N. Y., for 350,000 bricks to be used in the erection of the by-product coking plant to be erected in connection with the new plant of the Detroit Iron & Steel Co., on Zug Island, near Detroit.

The Modern Tool Co., Erie, Pa., manufacturer of die heads, dies, etc., is removing from Twelfth St. near Cranberry, to the building at the northeast corner of Fourth and State, which is 160x52 feet, and will occupy the first and second floors. This will give the company much better facilities for taking care of its increasing business. The plant has just been equipped with new and modern machinery from the Brown & Sharpe Mfg. Co. and the Pratt & Whitney Co.

The A. W. Stevens Co., Marinette, Wis., manufacturer of harvesting machinery, has closed its plant until Dec. 1 on account of lack of iron, steel and fuel. The plant will be thoroughly repaired.

W. H. Price and C. H. Stewart, of Norwalk, O., have brought suit for foreclosure of a mortgage for $8,612 on the Norwalk (O.) Foundry & Machine Co. The plaintiffs also ask for the appointment of a receiver.

The Philadelphia Pneumatic Tool Co. states that its anticipations in regard to the volume of business for the month of September were fully realized, the sales for that month having amounted to 20 percent more than any previous month. During the current month the monthly record for foreign shipments has already been broken, large orders having been received from Great Britain, Germany, France, Italy and Denmark.

A number of citizens of Detroit, including Russell A. Alger, Jr., have subscribed to an increase of stock of the Ohio Automobile Works at Warren, O. Plans for the future have not been determined and the report that the plant is to be moved to Detroit is not authorized. We are informed officially that such a change is not being considered.

The Star Corundum Wheel Co., of Detroit, whose corporate existence was recently dissolved by the sale of its property and franchises, has been succeeded by the Star Corundum Wheel Co., Ltd., and offices and factory of the company have been removed from 21st and Standish Sts. to 224-258 21st St., where capacity has been greatly increased, the company having doubled its floor space and having added additional equipment. John R. Kempf, manager of the old company, will continue in a similar capacity in the new.

The Singer Mfg. Co., Elizabethport, N. J., whose negotiation for the purchase of the property of the Musconetcong Iron Works, at Stanhope, N. J., was mentioned in these columns last week, has purchased the blast furnace, limestone quarry, real estate and mining interests of the latter company and will take possession Feb. 2, 1903. We are informed that there will be no change of management or employes at Stanhope.

The Andrews & Hitchcock Iron Co., Youngstown, O., manufacturer of Hubbard Scotch foundry and Bessemer pig iron, will make extensive additions to its furnace plant at Hubbard, O. The company has awarded contracts for two new blowing engines, a large addition to the engine house, brick hot blast stoves, etc., which will very largely increase the capacity of the furnace, as these improvements take the place of some old small engines and iron stoves.

The Allegheny Ore & Iron Co., Clifton Forge, Va., has secured control of the Victoria Coal & Coke Co., whose mines and works are at Cooperston, W. Va. About 150 coke ovens will be erected and a number of improvements made.

The Chesapeake Iron Works, Baltimore, Md., which was recently incorporated, has equipped a plant at 336 to 342 North St. Its product will consist mainly of light ornamental work, mostly wrought iron. The company will carry a large stock of beams, channels, angles, and cast iron columns.

The first definite step in the reorganization of the Virginia Iron, Coal & Coke Co., general offices, Bristol, Va.-Tenn., has been taken by the election of Henry K. McHarg, of New York, to succeed Grant B. Schley as president of the company. It is reported that the receivers, who have paid off about $2,500,000 bonded indebtedness, will be dismissed about Jan. 1, 1903.

All rod rolling records were broken recently at the Rankin Works of the American Steel & Wire Co., at Rankin, Pa. The night turn made 571,000 pounds of No. 5 rods and the day turn following made 556,000 pounds.

"NEVER CAUGHT NAPPING"—

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ONE reason why Cochrane Separators give such efficient service is because they will do their work properly under such widely differing conditions. If you have but 1 per cent of water with the steam, a Cochrane Separator will take out 90 per cent of it. Or you may have 60 per cent of water present and a "Cochrane" will take out 99 per cent, if the steam is traveling at normal velocity.

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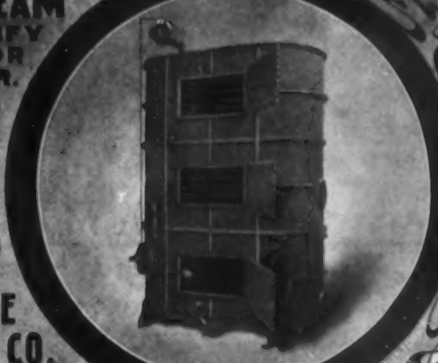

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COLD ROLLED STRIP STEEL

ALL WIDTHS, GAUGES AND TEMPERS

IN COILS OR CUT TO LENGTHS

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GALVANIZED AND PAINTED BARB WIRE

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WIRE RODS of open hearth and Bessemer steel.

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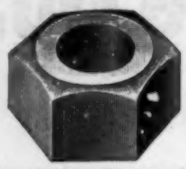

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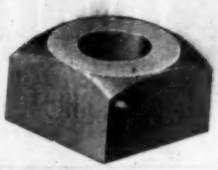

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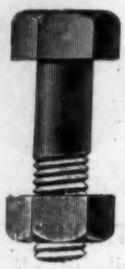

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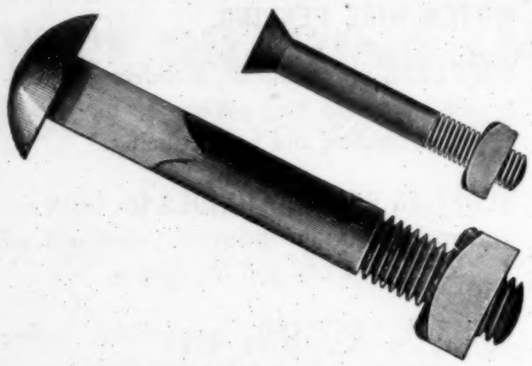

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